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A
T R E A T I S E
O N
C A T T L E:
SHOWING THE
MOST APPROVED METHODS OF
Breeding, Rearing, and Fitting for Use,
ASSES, || *SHEEP,*
MULES, || *GOATS, and*
HORNED CATTLE, || *SWINE.*

WITH DIRECTIONS FOR
THE PROPER TREATMENT OF THEM IN THEIR
SEVERAL DISORDERS:

To which is added,

A Dissertation on their Contagious Diseases.

Carefully collected from the best AUTHORITIES, and
interspersed with REMARKS.

By JOHN MILLS, Esq.

Fellow of the Royal Society of London, Honorary Member of the Dublin Society, of the Royal Societies of Agriculture at Paris and Rouen, of the Oeconomical Society of Berne, and of the Palatine Academy of Sciences and Belles-Lettres.

132023

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MILL'S

MODERN SYSTEM OF FARRIERY;

Comprehending all the most valuable PRESCRIPTIONS and approved REMEDIES, accurately proportioned and properly adapted to every known disease to which the Horse is incident; together with the most approved methods of breeding, rearing, and fitting them for use; also directions how to judge of Horses.

To which is added,

A successful Method of treating the CANINE SPECIES in that destructive Disease called the Distemper.

By JOHN MILLS, Esq.

Author of the TREATISE ON CATTLE, &c.

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A
T R E A T I S E
ON
C A T T L E.

BOOK I.

Of ASSES.

FEAR from deserving the contempt in which he is generally held, the *ass* is, in fact, one of the most necessary animals about a farm-house. He costs hardly any thing to keep, and does a great deal of work, such as carrying corn to the mill, provisions to the market, or to labourers in the field, with numberless other useful offices; for, in proportion to his size, he will carry a heavier load than perhaps any other animal. In some countries too, he is made to till the ground where the soil is light, to draw a cart, and even to serve instead of a horse for riding post: nor is there any more easy going, or surer footed creature. The milk of the female is an excellent medicine to man, particularly in consumptive and gouty cases; and the skin

of these animals is rendered serviceable and profitable after they are dead; for of it, being very hard and very elastic, are made drums, sieves, &c. The merit of the ass's skin pocket-books is well known; and in many parts the peasants make good strong shoes of the tanned skin of the ass's back. It is also with the hinder part of the ass's skin that the Orientals make the *sagri* (a), which we call shagreen†. The dung of asles is an excellent manure for strong or moist lands.

Is it then, as M. de Buffon compassionately asks on this occasion (c), that men extend their contempt of those who serve them too well and too cheaply, even to animals? The horse, continues he, is trained up; great care is taken of him, he is instructed and exercised; whilst the poor ass, left to the brutality of the meanest servant, and the wantonness of children, instead of improving, cannot but be a loser by his education. Most certainly, if he had not a large fund of good qualities, he manner in which he is treated, would be sufficient to exhaust them all. He is the sport, the butt, the drudge of clowns, who, without the least thought or concern, drive him along with a cudgel; beating, over-loading, and tiring him. It is not remembered, that the ass would be, both in himself and for us, the most useful, the most beautiful, and most distinguished of animals, if there were no horse in the world. He is the second, instead of being the first; and for that alone he is looked upon as nothing. It is the comparison that degrades him. He is considered, he is judged of, not in himself, but relatively to the horse. We forget

(a) See Thevenot's *Travels*, tom. II. p. 64.

† The belt is made with the skin that covers the rump and buttocks of the wild ass. It is prepared in Syria, and comes from Constantinople.

(c) *Histoire Naturelle de l'Asne.*

that he is an ass; that he has all the qualities of his nature, all the gifts annexed to his species; and think only on the figure and qualities of the horse, which are wanting in him, and which he could not have without ceasing to be an ass.

By his natural temper, he is as humble, as patient, and as quiet, as the horse is proud, fiery, and impetuous. He bears with firmness, and perhaps with courage, blows and chastisements. He is sober, both with regard to the quantity and quality of his food; contenting himself with the harshest and most disagreeable herbs, which the horse and other animals disdain to touch. In water, indeed, he is very nice, drinking only of that which is perfectly clear, and at brooks he is acquainted with. He is as temperate in his drinking as in his eating, and does not plunge his nose into the water, from a fear, as is said (d), of seeing the shadow of his ears; and to this also, some, with great seeming reason, impute his being less subject to the glanders than the horse*. As no one bestows upon him the pains of currying, he often rolls himself on the grass, on thistles, or on fern; and, without

(d) *Cardanus, de Saltilitate, l. 2.*

* Quadrupeds do not all drink in the same manner, though all are under the like necessity of stooping their heads to the water, because they cannot otherwise reach it; the monkey and some few others excepted, which, having hands, can drink like a man out of a vessel given them; for they put it to their mouth, and inclining the vessel, pour out the liquor, which they swallow merely by the motion of deglution. The dog, the aperture of whose mouth is very large, and furnished with a long and slender tongue, drinks by lapping; that is, licking up the water, and forming with his tongue a cup, which being filled every time, brings up a pretty large quantity of liquor. This method he prefers to that of wetting his nose. Whereas the horse, having a less mouth, and his tongue too thick and short to form a large cup, and which, besides, drinks eagerly, thrusts his nose to some depth into the water, which he thus swallows plentifully by the simple motion of deglution. But this very circumstance obliges him to drink all at a breath; whereas the dog breathes freely all the time he drinks, and so does likewise the ass, who only just touches the water with his lips.

minding his lord, he lies down to roll as often as he has an opportunity, as if to reproach his master with the little care taken of him; for he does not wade like the horse in mud and water, but is cautious even of wetting his feet, and turns aside to avoid any dirt: accordingly, his legs are drier and more cleanly than those of the horse. He is susceptible of education†, and some have been trained in such a manner as to be shown for a curiosity (g). Regular currying and rubbing down would undoubtedly much improve the look of the ass, and be of service to its health.

In his early youth he is sprightly, and not void of prettiness, agility, and good humour; but he soon loses these good qualities, either through age or ill treatment, and becomes sluggish, untractable, and obstinate; eager only for pleasure, or rather so mad after it, that nothing can restrain him; nay, some have been known to be so violent, as to die within a few minutes after copulation; and as his love is a kind of frenzy, so he has also the strongest affection for his issue. Pliny assures us, that if the dam be separated from her foal, she will rush through flames of fire to rejoin it. The ass is also fond of his master, though generally ill treated by him. He smells him at a great distance, and distinguishes him from every other man. He likewise knows again the places where he has been used to live, and the roads which he has travelled. His sight is strong, and his smell is surprisingly quick,

† In Persia they are taught to amble; to which purpose the fore and hind legs of the same side are tied together with cotton lines, at a greater or less distance apart, according to the step the creature is to make in ambling. These lines are fastened to the girth at the place of the surcups: a sort of grooms ride them morning and evening, and habituate them to this pace. Their nostrils are slit to give them the more wind, and they go at such a rate that there is no keeping up with them but on a gallop. *Voyage des Chev. Chardin, tom. II p. 26, 27.*

(g) *Alaudard, d. Quadruped. lib. I. p. 308.*

especially with regard to the effluvia of the she-*ass*. He is very quick of hearing, which has contributed to his having been ranked among the timid animals, who are all said to be very quick of hearing, and to have long ears. When over loaded he hangs down his head and drops his ears; when too much vexed, he opens his mouth and draws back his lips in a very disagreeable manner, which gives him a sneering and derisory aspect. If his eyes are covered, he stands motionless; and when lying on his side, if his head is placed in such a manner that one eye rests on the ground, and the other eye be covered with a stone, or piece of wood, he will continue in that posture, without shaking himself, or attempting to rise. Like the horse, he walks, trots, and gallops; but all his motions are short and much slower. Though he may run at first with some swiftness, he can do so but for a little way and a short time; and whatever pace he takes, he soon gives over if hurried.

The horse neighs, and the *ass* brays, which last is done by a very long and highly disagreeable and discordant cry through alternate dissonances, from the grave to the acute, and from the acute to the grave. He hardly ever makes this noise but when stimulated by lust or by hunger. The voice of the she-*ass* is clearer and shriller than that of the male. A castrated *ass* brays but weakly; and though he seems to make the same efforts, and has the same motions with the throat, his cry does not reach to any great distance*. Of all hairy animals, the *ass*

* That judicious investigator of the works of nature, M. de Buffon, thinks it a rule without exception, that in all quadruped animals, the voice of the male is stronger and deeper than that of the female; though some of the ancients tell us, that the cow, the ox, and even the calf, have a deeper voice than the bull. Certain it is, that the bull has a far stronger voice, as being heard to a much greater distance than either of them; and what gave rise to a belief of his voice being less deep, probably was his manner of lowing, which is not a simple sound,

is the least subject to vermin. He is never troubled with lice, probably owing to the hardness and dryness of his skin, which is indeed harder than that of most other quadrupeds; and this also renders him less sensible than the horse, to the whip, and the stinging of flies.

At the end of two years and a half, the ass sheds his foal teeth, and next the other incisories, which dropt out, and are renewed in the same order as those of the horse. The age of an ass is also known by the teeth; and the third of the incisories, on each side, is denoted as in the horse.

The ass is capable of generating so early as at the age of two years. The female is even sooner ripe than the male, and full as lascivious; for which reason she is a bad breeder, excepting again the seminal fluid she had just received in coition, unless the sensation of pleasure be immediately removed by loading her with blows; the only method of preventing the consequences of her amorous convulsions. This is a precaution without which they would very soon return. The most usual times of her heat are in the months of May and June. After pregnancy, her heat is soon over, and in the tenth month the milk appears in her teats. In the twelfth month she foals; and seven days after parturition, the heat returns, and she is again fit to receive the male; so that she may, as it were, be kept continually engendering and nourishing her young. There is hardly an instance of her having two foals at a time. At the end of five or six months the foal may be wained; and 'tis even ne-

ver composed of two or three octaves, the last of which most affects the ear; and if we listen to it, we shall perceive a sound more hollow than that of the ox, the cow, or the calf, whose lowings are also much hoarser. It is love only that causes the bull to low; the cow often low from fear, han love; and when the calf lows, it is from grief, hunger, or a desire to be with its mother.

ceilary that it should, if the dam be pregnant, in order that the foetus may have proper nourishment. At the age of three years he should be accustomed to work, and it will be right then to shoe him with a light shoe, particularly to guard the fore part of his hoof.

To have good ass's milk for medicinal uses, the she-asses must be found, in good case, and one that has foaled lately, and not been covered since. The foal that she then suckles must be taken from her; she must be kept clean, and fed with hay, oats, barley, and herbs whose salubrious qualities are adapted to the disease. This milk must not be suffered to grow cold, nor should it even be exposed to the open air, because in either of these cases it soon spoils.

A stallion-ass should be chosen from among the largest and strongest of his species. He should be at least three years old, and not exceed ten. His legs should be long, his body full, his head erect and airy, his eyes lively, his nostrils large, his neck longish, his breast broad, his back fleshy, his ribs broad, his rump flat, his tail short, and his pile glossy, soft, and of a dark grey. The most common colour in asses is the mouse grey; but there are also glossy greys, and grey mixed with dark spots, as well as some of a dun colour, some brown, and others black.

There are different breeds amongst asses, as well as amongst horses; but the former are less known, because they have been least attended to. That they all came originally from hot climates, is a fact scarcely to be doubted. Aristotle (i) assures us, that in his time there were no asses in Scythia, nor even in Gaul, where, he says, the climate is somewhat cold; to which he adds, that a cold climate

disables them from propagating their species, or causes them to degenerate: and we have Linnæus's testimony (*k*) that they have not been long known in Sweden*. In fact, they seem originally to have come from Arabia, and thence to have passed into Egypt, from Egypt into Greece, from Greece into Italy, from Italy into Spain and France, and afterwards into Germany, England, and lastly into Sweden, &c in all which countries it is to be observed, that the colder the climate is, the weaker and smaller the asses are.

The Spanish asses are by far the finest of any now in Europe. The climate, and the care that is taken of them, render them such; for, undoubtedly, on account of the badness of their roads and the sure-footedness of these creatures, the Spaniards, who make great use of them and of mules for travelling, feed and treat them well, and thereby render them beyond compare more gentle, active, and docile than they are with us. So great is the estimation in which they hold these animals, that a large, stout he-ass frequently sells for sixty guineas on the spot; and if it be suspected that he is to be carried out of the country, he will not be parted with for less than a hundred. In Auvergne too, where indeed the cold is felt as much as in any province of France, they have large and high-priced asses; and as they thrive as well, work as hard, and live as long in all parts of this island as they do in any other country whatever, it cannot be doubted that they would likewise do as well here in all respects, with

(*k*) *Fauna Sueca.*

* Neither asses nor horses were found in America when the Spaniards first discovered that country, though the climate, especially that of the southern parts, agrees with them as well as any other. Those carried over thither by the Spaniards, and turned loose in the large islands, and on the continent, have increased so considerably, that in several places wild asses are seen in troops, and they are taken in traps, like wild horses.

proper management. The present goodness of our roads in general, and the great plenty we have of all sorts of horses, may indeed, in some measure, account for our neglect of asses; but do we not carry that neglect too far? A little attention might perhaps discover purposes for which these animals are peculiarly proper; such as their travelling safely over high and stony mountains, passing securely through narrow winding paths in mines, and in the working of machines, for which they seem perfectly qualified by their natural steadiness.

The ass, which, like the horse, requires three or four years to attain its full growth, lives also, like that animal, twenty-five or thirty years: but the females are generally said to be longer lived than the males; a consequence, perhaps, of their being a little more tenderly used, on account of their being often pregnant; whereas the males are worked and beaten without intermission.

Asses sleep less than horses; and if ever they lie down to sleep, it is only when they are quite spent with labour. The stallion-ass also lasts longer than the stallion-horse. His eagerness seems to increase with his age; and in general the health of this animal is much more steady and confirmed than that of the horse. He is far more hardy, and subject to a much less number of diseases. Even the ancients mention few, except the glanders, and this is very rare. As to the rest, the diseases of these animals are to be treated in the same manner as those of horses.

BOOK II.

Of MULES.

THE mule is a beast of burden, begot by a male ass and a mare, or by a stallion horse and a female ass. There are both male and female mules, and both of them are very eager for copulation; but they do not breed, at least in climates like this. Some think it is because they proceed from two different species of animals: but others say positively that they do breed in hot countries.* In France, where many mules are bred, they are not suffered to couple, because that renders them vicious and spiteful.

* All animals which owe their origin to creatures of different species are generally termed *mules*, and accounted barren; but, though it does not appear that mules, proceeding from the ass and mare, or from a stallion-horse with a mare, produce any thing either living in themselves, or with those from whom they are derived; yet, as M. de Buffon believes in his *Natural History of the Goat*, this opinion is perhaps ill founded: for the ancients positively assert that the male is able to procreate at seven years, and that he does actually procreate with the mare (a). They also tell us, that a male is capable of conception, though it never brings it to maturity (b). These things, which throw a veil of darkness over the real distinction between animals and the theory of generation, should therefore either be confuted or confirmed. Besides, had we ever so clear a knowledge of all the species of animals around us, yet we know not what a mixture between themselves, or with foreign animals would produce. We are, continues this judicious writer, but ill acquainted with the *junar*, that is, the produce of the cow and the ass, or the mare and the bull. We know not whether the zebra would not copulate with the horse or the ass: whether the thick-tailed creature known by the name of the Barbary ram, would not produce without an ewe: whether the chamois be

(a) *Malus septennis impere potest, et jam cum equo conjungit hinnum procreavit.* Ardt. Hist. Animal. lib. VI. cap. xxiv.

(b) *Quae concipere quicunq[ue] mula potest, quod jam suffit eis;* sed evultere atque infundere non potest. *Mus gerare interdum potest.* Ardt. de Generat. Animal. lib. II. cap. vi.

Mules live a long while, often above thirty years. They are very healthy, and partake of the qualities of the animals from which they proceed; that is to say, they have the strength of the horse, and the hardiness of the ass. They seem born for carrying heavy burthens, for carrying them gently, and for lasting a long time. They hardly ever stumble. Their sense of smelling is uncommonly quick. They are very fantastical, and apt to kick, and their obstinacy is become proverbial. We know not of any wild ones.

In Spain, almost all the carriages are drawn by mules: they carry the baggage and equipages of princes and officers, and are of excellent service, particularly in mountainous places. Traders and millers use them there to carry their merchandize and their corn: they are even made to plow the ground, and to thresh the corn by treading it out.

They are also much used in Italy; and in Auvergne they are employed for every thing that is usually done elsewhere by horses and oxen, of which there are but few in that province of France. They form a part of the parade of great personages abroad when they make their public entries: and it is not long since the magistrates in France rode upon mules to their courts of justice, and physicians to visit their patients. The Flemings used formerly to breed from their large sized mares considerable numbers of very stately mules, some of them sixteen and some seventeen hands high, and

not a species of wild goat; whether it would not with our goat form some intermediate breed: whether monkeys differ in real species, or whether like dogs, they are all of one and the same species, but varied by a number of different breeds: whether the dog can produce with the fox and the vulture: whether the stag produces with the cow, the hind with the buck, &c. Our ignorance with regard to all these facts, is almost invincible; the experiments by which alone they can be decided, requiring more time, and more attention and expense, than the life and fortune of a common person will admit of.

they were very serviceable as sumpter-mules in the army: but since the Low Countries have ceased to bear the Spanish yoke, they breed fewer mules. They were also much more common in this country in former times than they are at present, being often brought over hither in the days of popery by the Italian prelates. They continued longest here in the service of millers, and are yet in use among them in some places, on account of the great loads they are able to carry. We also send some to the West-Indies, where they are much used and esteemed. Poitou, and the Mirebalais, in France, still continue to breed great numbers of mules, but Auvergne yet more, and these last are most esteemed*.

To have handsome and good mules, the stallion-ass should be in his full vigour, and therefore above three years old, and not more than ten: he should be of a good breed; for in the studs of mules, which are not uncommon in foreign countries, a stallion-ass of a good breed is worth sixty or seventy pounds, whereas a middling one will not fetch above eleven or twelve: he should be well made, that is to say, large sized, with a stout, thick neck; strong and broad ribs, an open and muscular chest, fleshy thighs, tight-made legs, and above all well provided in his genitals, as those of the Mirebalais are remarkably. As to the colour, the plain black, or black speckled with a rather lively red, or the silver grey, or grey intermixed

* The Spaniards have long had such a predilection for mules, that it raised the price of sheep-skins to the highest degree before mentioned, and produced an absolute prohibition of exportation. It has also lessened their regard and attention to horses; insomuch that the studs of Andalusia formerly esteemed the finest in Europe, have lost their credit, and future ages will hardly believe what has been truly said of the Spanish horses. To remedy this, the government have more than once thought of restricting the use of mules to ecclesiastics and women.

with dark spots, are the most esteemed: the mouse-grey, which is the most common colour of asses, should be rejected.

The mares should be under ten years of age, and as near as can be of the same colour as the stallion, especially when one desires to have black mules, which are the most esteemed. In the year 1689, it was enacted in France, that no stallion-ass should be given to a mare under fourteen hands high, which is tall enough to produce the finest mules; and the large, full-bodied mares in that country, are reserved for the multiplication of this breed.

The stallion-ass becomes so furious at the sight of the mare intended for him, that he must always be kept muzzled at that time, lest he should maim the grooms who lead her to him.

It generally is from the middle of March to the middle of June that the ass is given to the mares, in order that, as they go eleven or twelve months, the mules may be born at a time when there is plenty of good succulent grass, fit for the dam and her young one. The ass should be rested for a week before he covers the mare, and during that time he should have oats once a day, and be fed with good hay. Mares which have been covered by a stallion-ass go a whole year, and they cannot suckle their young ones above six months, on account of a pain they have in their teats after that time: these mule-colts must therefore be weaned at that time, or made to suck another mare.

The mules begot by an ass and a mare, are better and handsomer than those which come from a she-ass covered by a stone-horse: they are even two different kinds. Also the male-mules are stronger than the female, and therefore preferred for labour and long journeys.

A good male mule should have round and thickish legs, little belly, the body firm, and the rump

hanging down towards the tail. The female should also be full bodied, but with small feet and dry legs, well spread buttocks, a wide chest, a long and arched neck, and a small lean head.

The age of mules, both male and female, is known by their teeth, in the same manner as that of horses. Many judge of the height they will be of by the length of their legs. At three months the legs have attained their full growth, and they are then half the height of the mule.

When three years old, they are broken and trained like colts; but much greater patience is required here, because they are much more headstrong and fantastical. Wine is said to familiarize them; and one of their feet is tied up to the thigh to prevent kicking, and at the same time render them docile. They kick only with their hind legs. Many do not use them for work till they are five years old.

They are fed and managed in the same manner as horses, and are subject to the same diseases; consequently the methods of cure as generally practised for the latter, are likewise to be recurred to for these animals. The *Maison Rustique*, from whence I have borrowed the greatest part of this article, M de Buffon not having any where professedly spoken of the mule, says, (c) in addition to the treatment of their diseases, that a pint of red wine, in which half an ounce of flour of brimstone, a raw egg, and a dram of myrrh have been mixed, will, if given repeatedly for some time, in case of their growing lean, restore them to their flesh and good appearance; and also, that the same remedy will cure them of gripes and coughs.

(c) *Tom. I. part I. liv. III. chap. iii.*

BOOK III.

Of HORNED CATTLE.

CHAP. I.

Of the general Properties and Uses of Horned Cattle.

THE Ox is the most valuable of horned cattle. He costs but little to keep, and yields a considerable profit: is very good for draught, and for the plough; subject to few diseases, and those easily cured. He lives to a good age, and requires but a trifle to harness him, though no creature turns up the earth so well; and when he is worn out with service, he is fattened, and becomes excellent food; or, if he breaks a limb he is killed, and his flesh is eaten. His skin and his suet sell for a good price. Even his horns and his gall fetch somewhat, and his dung is a good manure. In short, he may justly be styled, by way of excellence, *the animal*; for, besides the great services which he renders to man, he returns to the earth full as much as he takes from it; even meliorates the soil on which he lives, and fattens his pastures; whereas the horse, and most other animals, exhaust the richest meadows in a few years. Without the ox, both rich and poor would find it difficult to subsist: the earth would lie uncultivated; our fields, and even our gardens would be dry and barren. He is a principal instrument in all works of husbandry, the most useful servant in a farm, and the support of rural *œconomics*; for on him depends the most laborious part of agriculture.

Formerly the wealth of man consisted chiefly in his herds of black cattle, and they still continue to be the basis of national opulence; for it is only by the cultivation of lands, and the abundance of cattle, that a state can be maintained in a flourishing condition. These are, alone, real goods: all others, gold and silver not excepted, are only arbitrary; money and credit having no other value than what they derive from the products of the earth.

That the ox is not so proper for carrying burdens as the horse, the ass, the mule, the camel, and some other beasts, is evident, from the form of his back and reins: but his thick neck and broad shoulders declare him to be perfectly fit for draught; and accordingly it is with them that he draws to the greatest advantage, though such is the absurdity of some men, and such their blind attachment even to the most ridiculous customs, that he still is, in many parts, and particularly in several of the provinces of France, made to draw by his horns, on the shallow pretence of his being then most easily guided: a custom almost as preposterous as was that of the Irish, who, till lately, used to make their horses draw the plough by their tails. It may indeed be true, that the strength of the ox's head is insufficient to enable him to bear tolerably well this method of labouring: but certainly he performs his work much less easily, and less well, than when he draws by the shoulders, which nature seems to have formed purposely for the plough. The unwieldy magnitude of his body, the slowness of his paces, the shortness of his legs, every thing, even his quietness and patience in till, evidently concur to fit him for tillage, and enable him, beyond any other animal, to surmount the constant resistance of the earth against his efforts. The horse, though perhaps equally strong, is less proper for this use;

his legs are too long, his paces too quick and impetuous, and he soon frets and tires. Besides, by putting him to the plough, we deprive him of all the agility and suppleness of his motions; of all the beauty of his attitude and carriage: for this heavy work requires rather perseverance than hard labour; rather strength than swiftness, and weight rather than elasticity: and accordingly, wherever the comparison had been made with any degree of accuracy between horses and oxen for the labours of the field, and especially for ploughing, the difference has been found to be considerably in favour of the latter, in every respect but that of speed; and even in this article their inferiority amounts to nothing more than being two hours in a day longer at work than horses: for they perform the same quantity of work every day, and that too in a better manner. It is universally allowed that they are cheaper in every sense; for they cost less when bought, are less expensive in their food, their harness, and their shoeing; are subject to much fewer disorders, require far less attendance, and at last remain fit for fattening when their labours are over, as was before observed. Yet, strange fatuity! notwithstanding all these advantages, they are so little used at present for the works of husbandry in this kingdom, that, if we may trust to the report of the author of the *Six Months Tour through the North of England* (a), and surely we may confide in what that gentleman says from his own personal inquiries and observations on the spot, whole counties in England, which, not many years ago, scarcely possessed a plough-horse, now have not a single ploughing ox.

To account for this very extraordinary and every way highly detrimental change, and at the same

(a) Vol. IV. letter xxxii.

time to refute the groundless opinion of those who look upon it as a kind of proof that horses are really preferable, the author here referred to, Arth. Young, Esq. F. R. S. very judiciously attributes it to the great price which live cattle have yielded of late years. "It is well known," says he, "that the regular course of business in the ox-counties, used to be, to keep three sets of beasts; one of young cattle that were coming into work; the teams; and fattening cattle, that had been worked three years. But when cattle came to be so very dear, as to cost when lean near as much as they sold for when fat, the ox-farmers were tempted to sell their young stock before they ploughed them; or at least to throw them directly to fattening, that their high value might come in the sooner. And as horses, once bought, required no annual addition, they by degrees increased with all poor farmers, to enable them to sell their oxen at high prices. The great decrease of the use of oxen during the period of live cattle selling so very high, gives some reason to suppose this the cause of it. I need not, surely, add, that this, or any other reason that can be offered, is, and must be, false and incomplete; and that the use of them in tillage is much superior to that of horses. The avarice of the farmers has alone driven them out of use, not for the sake of profit, but for raising money at a future expence. The great farmers in Northumberland, who, we are certain, are not poor, still continue to make much use of oxen, *viz.* half and half."

If the above arguments are not sufficient, the following indisputable fact, attested by the same observant writer, who relates what he himself saw, must surely silence for ever the

most prejudiced advocates for ploughing with horses. (b)

Wenman Cooke, Esq. of Longford, in Derbyshire, executes all his ploughing and home-carting, which are very considerable, with oxen harnessed nearly in the same manner as is practised for horses, excepting that the collars open to be buckled on, and are worn with the narrow end, which is the part that opens, downward. The chains are fastened to them in the same direction as in a horse harness, but much above the chest, and in a line almost even with their backs. The beasts of course draw thus much higher than horses. He likewise finds that they draw with much greater power in this manner than in yokes, that they move much faster, are more handy and convenient, and that they perform their work at much less expence than could be done by horses, as well as even more expeditiously, as appears from Mr. Cooke's ploughing as much land in a day with three oxen, as the farmers do with four or five horses. A disproportion so amazingly great, that, as Mr. Young very properly remarks, it decides at once, and in the clearest manner, the long contested point, whether horses or oxen are the fittest for the plough. Mr. Cooke feeds them in the summer on grass alone, and in the winter on straw; on which last indeed, he works them only moderately; but if hard, they then have hay, or some turneps. Mr. Young declares that he saw a team of oxen, thus harnessed, drawing a heavy load of bricks, and observed that not one horse-team in ten could have out walked them. The drivers assured him, that they worked much better thus than when yoked, that they were able to draw a greater weight, and were far more easily managed. When oxen are yoked, they

(b) In the *Farmer's Tour through the East of England*, vol. I. letter iv.

move awkwardly, and often with such inequality between the couples, that, as is well known to all ox-drivers, it is common for one beast to make its companion bear the whole stress of the draught. This inconvenience, as well as the objection that oxen trample the land too much when they are yoked together in ploughing, is totally removed in Mr. Cooke's method, which seems in fact to be an improvement of M. de Chateauvieux's, mentioned in the second volume of my system of husbandry (c). The making of the oxen go in a single line instead of a double one, is also extremely useful in some sorts of ploughing; and it has been proved by repeated experience, that they may easily be rendered so tractable as to be guided by a line like horses.

The cow may also be rendered fit for the labours of the field, and, though not so strong as the ox, be made to supply his place: but when she is employed in this service, care should be taken to match her as nearly as possible with an ox of equal strength and size, in order to preserve an equality of draught between them; for the less unequal they are, the more easily and readily the tillage is performed. Stiff lands, especially such as turn up in large long clods, often require six or eight oxen to plough them; whereas a sandy and loose soil may be tilled with only two cows: and besides, in this last, the furrows may be continued to a greater length than in the former. Among the antients, an hundred and twenty paces was the greatest length of a furrow which the ox was to make by one continued effort, after which, say they, he is not to be goaded farther, but allowed to breathe a while, before the same furrow is continued, or another begun. But, among the antients, agriculture was a favourite study: they did not dis-

(c) *Page 92—94:* where is also a drawing of the ox-harness invented by that illustrious cultivator.

dain to put their own hands to the plough; at least, they countenanced the husbandman, and consulted both his ease and that of the ox: whereas amongst us, they who enjoy the most of the products of the earth are, in general, the last to esteem, encourage and support the art of cultivation. There are few **STUART MACKENZIES**, sensible, like the immortal **SULLY**, that tillage and pastures are the only real foundation of the lasting prosperity of states.

The barren cow, which the country people call a *free martin*, has almost as much strength, and is nearly as fit for the works of husbandry as the ox. Its flesh too is said to be very nearly as good to eat *.

The principal use of the bull is to propagate the species; and though he also may be subjected to the yoke, yet one cannot be sure that he will work quietly, and the use which he may make of his prodigious strength is constantly to be guarded against. He is naturally untractable, stubborn and fierce, and, in the bulling season, absolutely uncontrollable, and often furious: but castration destroys the source of these violent impulses, without diminishing his strength. He also grows larger, heavier, and more unwieldy when castrated, and thereby becomes the better adapted to the labour for which he is intended. This operation likewise renders him more tractable, patient, docile, and less troublesome to others. A herd of bulls could not be either teamed or managed by all the skill and power of man.

* We are told, but may perhaps desire leave to doubt it, that when a cow brings a bull and a cow calf together, the latter is always a *free martin*, and never bears. The Romans were not unacquainted with the sterile cow, and call her *taura*. According to Mr. Lisle's information, the head of the *free martin* is coarser made than that of a heifer, her horns are wider spread, and her udder is smaller. He adds, that the flesh of a fatted *free martin* will fetch a half-penny a pound more than any cow beef.

Most country people know how to perform this operation: but the different effects which will result from the various times of performing it have not perhaps yet been sufficiently attended to. In general, the most proper age for castration is that immediately preceding puberty, which, in horned cattle, is eighteen months or two years; few of those that undergo the operation sooner, long surviving it. It is true, indeed, that calves, whose testicles have been taken out soon after their birth, become, if they survive the operation, which is very dangerous at that early age, larger, fleshier, and fatter, than those which are not castrated till their second, third, or fourth year: but in return, these last seem to retain more spirit and activity; and those which are not castrated till their sixth, seventh, or eighth year, lose little or nothing of their other masculine qualities, being more impetuous and difficult to manage than other oxen; nay, in their bulling season, they endeavour to get at the cows, which must be carefully guarded against, because the copulation, or even the bare touch of such an ox, produces in the vulva of the cow a kind of carnosities or warts, which nothing but the actual cautery can destroy.

The horned cattle, of which we now speak, afford a proof that the heaviest and most sluggish animals are not always those which sleep the longest, nor the most soundly; for the sleep of these is short, and so unsound, that the least noise awakes them. They usually lie on the left side, and the kidney on that side is always larger, and has more fat about it than that on the right side.

CHAP. II.

Of the Choice of Cattle, and of fitting them for Tillage.

OXEN, like other domestic animals, are of various colours. The dun is the most common, and the redder it is, the more the creature is esteemed: the black are also valued; and bay oxen are said to be vigorous and long-lived; whereas the brown soon decay. The grey, the pied, and the white, are commonly deemed fit only for slaughter; it being the general opinion, which by the bye I doubt, that no pains can render them fit for labour. However, be that as it may, whatever is the colour of an ox's coat, it should be glossy, thick, and smooth to the touch; for if it be harsh, rough, or thin, there is room to suspect that the animal is out of order, or at least not of a strong constitution.

The age of the ox is known by his teeth and horns. The first fore-teeth, which he sheds at the end of ten months, are replaced by others, larger, but not so white: at six months after this, the teeth next to those in the middle, fall out, and are also replaced by others: and in three years all the incisive teeth are renewed. They are then even, long, and pretty white; but as the creature advances in years they wear, and become unequal and black. It is the same with the bull and the cow; so that, consequently, the growth and shedding of teeth are not affected by castration, nor by the difference of sexes. Neither is the shedding of their horns affected by either; for the ox, the bull, and the cow, lose them alike at the end of three years, and they are alike replaced by other horns, which, like the second teeth, remain; only

the horns of the ox and cow are thicker and longer than those of the bull. The manner in which these second horns grow is not uniform, nor is their shooting equal. In the first year of their appearance, which is the fourth of the ox's age, two small pointed horns bud forth, neatly formed, smooth, and terminated by a kind of button towards the head of the animal. The next year this button moves from the head, being impelled by a cornues cylinder, which, also lengthening, is terminated by another button, and so on; for the horns continue to grow as long as the creature lives. These buttons become rings, or annular joints, which are easily distinguished in the horn, and by which the age of the animal may at once be known; reckoning three years for the point of the horn down to the first joint, and one year for each of the other intervals.

A good ox for the plough must be neither too fat nor too lean; his head should be short and thick; his ears large and shaggy; his horns strong, glossy, and of a middling size; his forehead broad; his eyes full and black; his muzzle thick, short and flat; his nostrils wide and open; his teeth white and even; his lips black; his neck fleshy; his shoulders large and heavy; his breast broad; his dew-lap hanging down to his knees; his reins very broad; his ribs broad, and not close; his belly spacious and sloping downwards; his flanks firm; his haunches large; his rump thick and very round; his thighs and legs large, fleshy and nervous; his back straight and full; his tail reaching to the ground, and well covered with thick and fine hair; his feet firm; his hide thick and pliable; his muscles raised; and his hoof short and broad. He must also answer to the goad; be obedient to the voice of his driver, and easy to govern: but it is only gradually, and

by beginning early, that he is brought willing to bear the yoke, and be easily managed.

At the age of two years and a half, or at farthest three, it is time to begin to tame him, and bring him under subjection; for if this is delayed longer, he becomes headstrong, and often ungovernable. The only method of succeeding herein is, by patience, mildnets, and even carelessness; for violence and rough usage will only disgust him beyond the power of recovery. Stroaking him gently along the back, clapping him with the hand, giving him occasionally boiled barley, ground beans, and such other aliments as please him most, all of them mixed with salt, of which he is very fond, will prove of the greatest use. At the same time a rope should be frequently tied about his horns, and some time after the yoke should be put about his neck, and fastened, first to a pair of wheels only, and then to a plough, with another ox of the same size ready trained: after this they should be tied together at the same manger, and be led together to pasture, that they may become acquainted, and accustomed to step alike. The goad should never be made use of at first, because it then would only render him more untractable. He must also be indulged, and labour only at short intervals; for till he has been thoroughly trained, he tires himself very much; for which reason also he should then be fed more plentifully than at other times. Also, when he is to work, especially if it be in stiff or stony ground, and likewise when he is to go upon the road, he should be thod, or, as the country people and farriers term it, cued. He should draw the plough only from his third to his tenth year; for after this it will be advisable to fatten and sell him, his flesh being then better than it he was kept longer.

It is said that oxen which feed slowly bear labour better than those which eat faster; that such as

have been bred in dry and high countries, are handsomer, more vigorous, and more sprightly, than those of low and moist countries; that dry hay strengthens them more than soft grafts; that they cannot bear a change of climate so well as horses; and that, for this reason, oxen for labour should always be purchased in the neighbourhood of the place where they are to work.

In general, countries somewhat colder than our own seem to agree better with black cattle than those which are hotter; and they are larger and more fleshy, in proportion as the climate is moister, and abounds in pasture.

The largest black cattle that we know of are those of Denmark, Podolia, the Ukraine, and Calmuck Tartary. The English, Irish, Dutch, and Hungarian cattle are also larger than those of Persia, Turkey, Greece, Italy, France, and Spain; and the smallest we know of are those of Barbary, and our own islands of Alderney and Man. The Dutch import yearly from Denmark numbers of large lean cows, which, when improved by living in the rich pastures of Holland, yield a great deal more milk and butter than our common breed of cows. Their calves are also much larger and stronger; and, except four or five days before their calving, they may be milked during the whole year. These cows, commonly called Flanders cows, require excellent pastures, though they eat little more than the common sort; but as they are always lean, the superabundance of their food turns wholly to milk; whereas our common cows, after living some time in luxuriant pastures, become fat, and yield little or no milk. From a bull of this kind and a common cow, is produced another breed, called *bastard*, which is both more prolific, and abounds more in milk than the common breed. These bastard cows often bring two calves at once, and also yield milk all the year round. They con-

stitute a large part of the wealth of Holland, which exports every year butter and cheese to a very considerable amount. These cows give much more milk than our common ones, as was before said, twice as much as those of France, and six times as much as those of Barbary.

The best English oxen and cows, for largeness and neatness of shape, are bred in the counties of York, Derby, Lancashire, Stafford, Lincoln, Gloucester, and Somerset. Those bred in Yorkshire, Derbyshire, Lancashire, and Staffordshire, are generally black, with large well-spread horns. Those of Lincolnshire are, for the most part, pied, very tall and large, and fittest for labour. Those bred in Somersetshire and Gloucestershire are generally red, and for shape much like those of Lincolnshire. Wiltshire breeds large cattle, but with ill-shaped heads and horns. Surry is famed for a breed of white cows, which are said to yield an uncommonly rich milk; and it is added, that their flesh takes salt more readily than that of any other breed. The black sort is commonly the smallest, but at the same time very strong, and consequently fit for labour. The cows of this colour seldom yield more than a gallon of milk at a meal, as it is called; but continue to bear being milked till within a very few days of calving. The white and red sorts give, in general, near three times as much milk as the black, but grow dry much sooner; especially the white. The red kind is generally the largest of any sort we have in England, and is commonly thought to give more and richer milk than those of other colours. Some likewise say that they bring better calves, and therefore advise keeping this breed free from mixture with any other. It may certainly be looked upon as a general rule, that the cow which gives milk longest is best both for the dairy and for breeding; and that the younger the cow is,

better will be the breed, provided she be past her second year.

A gentleman will choose the cow that gives the best milk, in preference to one which yields a larger quantity of less good; whereas the latter will answer best to the farmer, for fattening calves, lambs, and his whole breed of swine. The bullock of a moderate size will also be preferred by the gentleman, for beef for his table, because its flesh is better relished, and finer grained; and the larger size may be more prized by the farmer, because they fetch more money at market, their flesh being most esteemed for salting, especially for naval use; for it is found to shrink less, and to be less preyed on by the salt, than the beef of smaller cattle.

C H A P. III.

Of Feeding, Fattening, and Tending of Cattle.

THE ox eats fast, and takes in a short time all the nourishment he wants, after which he ceases to eat, and lies down to chew the cud; whereas the horse feeds both day and night, slowly, but almost incessantly. This difference in their manner of feeding proceeds from the different make of their stomachs: for the ox, whose two first stomachs form but one very capacious bag, can easily swallow so large a quantity of herbage as soon to fill his maw, and that done, he chews the cud afterwards, and digests it at leisure; whilst the horse, having but a small stomach, can put into it only a small quantity of grass, and continue to replenish it as the food sinks and passes into the

intestines, where the decomposition of the aliments is chiefly performed: and accordingly, upon inspection of these parts both in the ox and the horse, and the successive effect of digestion, particularly the decomposition of hay, M. de Buffon saw (a), that, in the ox, on its leaving that part of the maw which forms the second stomach, it is reduced to a kind of green paste, like spinach minced and boiled; that it retains this appearance in the folds of the third stomach; that the decomposition is completed in the fourth stomach; and that what passes into the intestines is only the husks and re-crements: whereas in the horse, he observed, that this decomposition is hardly visible, either in the stomach or first intestines, where it becomes only more supple and flexible, having been macerated and penetrated by the active liquor with which it is surrounded; and that it reaches the cæcum and colon without any great alteration; that it is in these two intestines, whose enormous capacity answers to the maw in ruminating animals, that the decomposition of a horse's aliment is chiefly performed; and that this decomposition is never so perfect as that in the fourth stomach of the ox.

From these observations, and the bare inspection of the parts, it is easy to conceive how rumination is performed, and why the horse neither ruminates nor vomits; whereas the ox, and all the horned cattle, with other animals which have several stomachs, seem to digest the grass only by rumination, which is nothing more than vomitting without effort, occasioned by the re-action of the first stomach on the aliments it contains. The ox fills his two first stomachs (the second being only a part of the first), and the membrane thus extended re-acts on the grass within it, which has been but very

(a) *Histoire Naturelle de Boeuf.*

little chewed, and its bulk increased by fermentation. Were the aliment liquid, this contracted force would make it pass into the third stomach, which communicates with the other only by a narrow duct, the orifice of which is situated at the upper part of the first, and but little below the œsophagus; so that no dry aliment can pass through this duct, or at least none but the more fluid part of it. Thus the drier parts necessarily ascend through the œsophagus, whose orifice is larger than that of the duct into the mouth. Here the animal chews them again, macerates, and once more impregnates them with its saliva; and thus by degrees renders the aliment more fluid, till it is reduced to a paste of a proper liquidity to pass through the duct which communicates with the third stomach: and here again it undergoes another maceration, before it passes into the fourth stomach, where the decomposition of the food is compleated, by being reduced to a perfect mucilage.

What confirms the truth of this explanation is, that while these animals suck, or are fed with milk and other fluid aliments, they do not chew the cud: and that they chew the cud much more in winter, and when fed with dry food, than in summer, when the grass is succulent and tender. In the horse, on the contrary, the stomach is very small, the orifice of the œsophagus very narrow, and the passage from the stomach to the intestines, or pylorus, very wide, which alone would render rumination impracticable; for the food contained in this small stomach, though perhaps more strongly compressed than in the large stomach of the ox, cannot re-ascend, because it may so easily descend through the capacious orifice of the pylorus. It is therefore owing to this general difference in the conformation of the parts, that the ox ruminates, and the horse cannot: but there is another particular

formation in the horse, which renders him not only unable to ruminant, that is, to vomit without effort, but even hinders him from vomiting at all, though he should make the strongest efforts so to do; and this is, that the duct of the *oesophagus* enters so obliquely into the horse's stomach, that instead of opening by the convulsive motions of the stomach, it becomes contracted. Though this difference, like all the other differences of conformation observable in the bodies of animals, depends on nature when constant and unvaried; yet, in the growth, and especially in the soft parts, there are differences apparently constant, which however may, and actually do, vary by circumstances: for instance, the capacity of the ox's maw is not wholly derived from nature: it is not such by its primitive conformation, but is gradually rendered so by the large bulk of the aliments put into it; for in a young calf, or even in one that is older, if the animal is fed only on milk, and never on herbage, the maw is much smaller in proportion than in the ox. The very great capacity of the maw therefore proceeds from the extension occasioned by the large bulk of aliments put into it at one time; as M. de Buffon has clearly proved by the following experiment (*b*). He caused two calves of the same age, and weaned at the same time, to be fed, one with bread, and the other with grass; and at the expiration of a year, on opening them, the maw of the calf which had lived on grass and herbage, was become much larger than the maw of that which had been fed with bread. I have been the more particular in the above account of the manner in which ruminating animals are nourished, and of the causes why the horse can neither ruminate nor vomit, because it may afford some satisfaction

(*b*) See *ibid.*

to those who might not, perhaps, otherwise be able readily to assign a reason for their different ways of feeding.

A general caution proper to be attended to on this occasion, is, that great care should be taken not to over-stock a pasture with cattle; because the greatest profit really arises from their being constantly kept in good condition; especially those that give milk, and those that are big with young. The stinted breed of cattle which we often meet with, and usually impute to the poorness of the pasture, badness of the climate, &c is in fact generally owing to the mismanagement of their owners, who, through a very ill-judged greediness, over-stock their pastures, and thereby disable the mothers from giving sufficient nourishment to their young, either before or after they are born: and this original stinting sticks by them through life, unless they chance to get very early into a rich pasture; for then, indeed, they sometimes soon outstrip their original breed; a circumstance which proves, that if they were at all times equally well kept, the breed would be much mended.

As oxen are not worked much in the winter, good straw, and a little hay will then nourish them sufficiently: but during the time that they do labour, they should have a great deal more hay than straw, and even a little bran or oats before they go to work. In summer, if hay be scarce, they may have grass fresh cut from the field, or the young succulent boughs and shoots of ash, elm, oak, and other trees; but these last should be given sparingly, because an excess of this aliment, of which they are very fond, sometimes causes them to make bloody urine. Clover, lucerne, sainfoin, burnet, when these can be had; vetches, boiled barley, turnips, carrots, parsnips, cabbages, &c. are also excellent food for these animals. There is no need to mea-

sure out the quantity of their food, because they never eat more than they want; and it is therefore proper always to give them more than they will eat*. They should never be turned into the pastures till about the middle of May; because the first growth of the grass and other herbs is too crude, and though they eat them greedily, they disagree with them. After they have spent the summer in the pastures, they should be housed about the middle of October; taking care that these transitions from green food to dry, and from dry to green, be not done at once, but by degrees.

The custom of giving salt among the fodder is of an old date, for Columella mentions it (c) as the practice of his time, and very properly recommends it much, as well calculated to promote their appetite, and consequently to assist their fattening. I have heard it observed by a gentleman from America, that the desire for salt is much greater in cattle and horses at a distance from the sea, than in the countries near it; owing perhaps to a greater freshness of the water. Even in Switzerland, the native horses of that country are very fond of salt, and it is a constant custom to give it them. There are in several parts of America, distant from the sea, spots discovered by the wild beasts, such as deer and buffaloes, where the earth is of a saline nature, to which these creatures resort regularly, and lick the earth with their tongues. They are called *salt-licks*, and are sometimes an hundred or an hundred and fifty feet wide.

Salt mixed with hay, which has not been well

* Cattle, and all other animals which chew the cud, have the singular advantage that they never eat more at once than is sufficient for them; for they then lie down and chew the cud: whereas horses, and many other animals, continue to eat as long as they are able to swallow.

(c) *Lib. VI. c. 17.*

got in, seems to act as an enemy to that fermentation in the juices which raises the heat in the hay: for where it is mixed with paste or other soft substances, it prevents putrefaction; probably by hindering the necessary preceding ferment. Thus it becomes useful in hay on a double account.

Though violent cold is very hurtful to these creatures, great heat is perhaps still more so. For this reason, in the summer-time they should be led to their work by break of day, and when it grows very hot, be either sent home, or left to feed under the shade of trees, and not returned to work again till three or four o'clock in the afternoon. In autumn, winter, and spring, they may be at plough from eight or nine in the morning, till five or six in the evening without intermission. But I cannot, by any means, approve of keeping them continually out of doors; especially for cows that give milk, or are with calf. It is surely inhuman to expose a creature to a degree of cold which it is not naturally fenced against.

Though oxen do not require so much attendance as horses, yet to keep them brisk and healthy, it will be proper, especially when they work, to curry them every day, to rub them down, wash them, clear their feet of gravel and dirt, grease their hoofs, &c. They must also have drink twice a day, morning and evening. The horse likes a thick and warmish water; but for the ox it must be clear and cool. The pavement of their stables should be a little inclined, that wet may not rest on it, and they should also have dry litter laid under them.

The age at which oxen are generally fattened is their tenth year, because there is no certainty of succeeding therein afterwards, nor is their flesh so good when they are older. They may be fattened in any season of the year; but summer is commonly chosen, because it is done then at least expence. If

it is begun in May or June, they are generally completely fattened before the end of October. From the very beginning to fatten them, they must be taken from all work, drink often, and have plenty of succulent food, sometimes mingled with a little salt as before said; or, when a beast falls off his stomach, grass dipped in vinegar will also restore his appetite, and consequently help to make him fatten the sooner. They must not be disturbed while they are chewing the cud; and during the great heats, they should sleep in the cow house, or some other shady place. By this means they will become so fat in four or five months, as to be scarce able to walk; so that if they are to be sent to any distant place, it must be by very slow journeys that they are removed. Cows, and even bulls whose testicles have been knit, may also be fattened: but the flesh of cows is drier, and that of the knit-bull redder and tougher, than the flesh of oxen; and that of the bull has always a strong, disagreeable taste.

Turnips are made to yield a great profit in feeding and fattening of cattle, particularly in Norfolk, and, of late years, in several other counties in England. When large, they should be sliced, as well to enable the beasts to eat the quicker, as to prevent their choking themselves, which they would otherwise be apt to do. Carrots are yet wholesomer, much more substantial, and consequently more profitable food: besides which, they render the flesh of the cattle that are fed with them firmer and better tated, as the Flemings have long experienced: but a yet more nourishing food is parsnips, especially for milch cows, which, when fed with them, give more milk than with any other winter fodder, and that milk yields better butter than the milk of cows nourished with any other substance. Cattle eat their roots raw at first, sliced

lengthwise; and when they begin not to relish them, they are cut in pieces, put into a large copper, pressed down there, and boiled with only so much water as fills up the chasms between them. Our neighbours in Brittany reckon one crop of parsnips, used for feeding cattle, equal in value to more than three crops of wheat (b). Potatoes are another good and very heartening food, and may, as has been before said of parsnips, be parboiled when cattle like them best that way. Buck-wheat makes very good fodder for cattle; and so does, in particular, the yellow-flowered vetch. In Germany and Flanders, spurrey is preferred before any other fodder, not excepting even corn, and is found to produce the richest milk and best butter. Cabbages, especially the Scotch kale and the great American cabbage, are reckoned preferable to turnips, in point of health as well speed in fattening, and it is laid, that one acre of them will go as far as three of turnips: but it is to be observed, that in using them, especially for milch-cows, the withered or decayed leaves should be thrown away, because they are thought to give a bad taste to the milk.

Clover is undoubtedly an excellent food for cattle, and we are told that one acre of it will feed as many of them as four or five acres of common grass: but they should never be turned into it in wet weather, no, whilst the dew is yet upon the plant, lest it should burn them. It should be given them sparingly at first, till it purges them: for when it has produced this effect, the danger is generally over. But of all the plants that are given to cattle for their food, none is equal to lucerne, either for early, speedy, or good fatting; for with this

(b) *Offerts à la Société d'Agriculture, de Commerce, et d'Industrie par les Etats de Bretagne. Années 1757 et 1758. p. 22.*

the grazier may begin fattening towards the end of April, and finish about the middle of harvest, when meat generally bears an high price. A large fattening ox may be allowed forty pounds, or perhaps more, of green lucerne each day*. All cattle are remarkably fond of lucerne, and always prefer that which has been cut a day or two, and stood twenty-four or forty-eight hours in a dry, shady place. By this precaution too all danger of its swelling them, which it might otherwise be apt to do, like clover and trefoil, is removed: only it is to be observed, that more caution should be used in giving it to cows, than to bullocks. When oxen or heifers are fed for the butcher with lucerne, the fat will spread itself through the lean, like veins in marble; and the flesh will be remarkably well flavoured.

Oil-cakes, meaning the residue of the seeds of lin, rape, or cole-seed, after their oil has been expressed from them, are well known to be great fatteners of cattle, especially if these drink plentifully with them: but they are apt to render the fat yellow and rank. To remedy this, the cattle should be fed with dry fodder, for a fortnight or three weeks before they are killed.

A beast is well-fed outwardly, that is to say, well covered with flesh, when his huckle-bones appear round and plump, his ribs smooth, his flanks full, his neck thick, his cod round, and, on feeling him upon the nethermost ribs, the skin feels soft and loose; and if, besides the above marks, the setting on of the tail feels thick, full and soft, and the navel round, soft, large and plump, it is a sure sign that he is also well tallowed, that is, well fatted inwardly.

* The antient Romans allowed twenty pounds of lucerne-hay at night to a large labouring ox, that was not fatting.

All these creatures are very apt to lick themselves, when at rest, and this is thought to be an impediment to their fattening. To prevent it, all the parts of their bodies within their reach are rubbed over with their dung; without this precaution, their tongues, which are very rough, abrade, or take off their hair, which they swallow; and as this cannot be digested, it remains in the stomach, gathers together there, and forms by degrees round balls, called *ægagropiles*, which always hinder digestion, and sometimes grow so large as to be very troublesome, and even to endanger the life of the animal. They are, in time, covered with a brown crust proceeding from an inspissated mucilage, which, by continual friction and coction in the stomach, becomes hard and glossy. These balls are found only in the maw: for if any hair gets into the other stomachs, it does not remain either there or in the intestines, but probably gets off with the excrements. However, this subject, and the disorders occasioned by these balls, will be treated of more fully in the fifth chapter of this book, where I shall speak of the distempers to which these animals are subject.

I cannot conclude this subject of the feeding of oxen, without adding M. de Buffon's just remark, that animals which have incisory teeth in both jaws, such as the horse and the ass, nip short herbage more easily than those whose upper jaw is without incisories: and if sheep and goats cut the grass very close, it is owing to the smallness and thinness of their lips; but the thick-lipped ox can only crop the long herbage: and this is the true reason why he never injures the pastures in which he lives. As he crops only the extremity of the long herbage, he does not affect the root, and retarded its growth but very little; whereas the sheep and the goat, by biting the herbage very close, both

destroy the stem, and injure the crown of the root. The horse chooses the most slender herbage, and leaves the larger, whose stems are hard, to feed and multiply; whereas the ox crops those thick stems, and thereby destroys by degrees the coarser herbage. Hence it is, that, after some years, the herbage where a horse has lived becomes coarse; whereas that where the ox has fed becomes a fine pasture.

C H A P. IV.

Of the Propagation of Cattle; Care of the Cow whilst pregnant, and Management of the Calf till fit for Slaughter, or for Work.

SPRING is the usual season for cows to be in heat. In this country, most of them admit the bull, and become pregnant, between the middle of April and the middle of July. Some indeed are more forward, and others more backward in their heat. They go nine months, and calve at the beginning of the tenth; consequently the regular season for calves is from the middle of January to the middle of April: but there is no scarcity of them during the whole summer, autumn being the time when they are least abundant. The tokens of the cow's heat are not at all equivocal: it is known by her frequent lowings, which are also more violent than at other times: she leaps on cows, oxen, and even bulls; and the vulva is inflated so as to project outward. The time of this strong heat should be particularly noticed, and the bull should be brought

to her then; for if she be suffered to cool, she will not so certainly retain afterwards.

The bull, like the stallion among horses, should be chosen from among the most beautiful of the species, and between the age of three years and ten, as before observed; but the nearer he is to three, the greater will be his vigour. He should be large, well-made, and in good plight; his eyes should be black, his look proud, his forehead broad and curled, his head short, his horns thick, short and black, his ears long and shaggy, his muzzel large, his nose short and strait, his neck thick and fleshy, his shoulders and breast broad, his reins firm, his back strait, his buttocks square, his tail high-placed, long, and full of hair, his thighs round and well trussed, his legs thick, short-jointed, and full of sinews, his knees round, big, and strait, his feet far asunder, not broad, nor turning in, but spreading easily, his hoof long and hollow, his hide pliable, the hair of all his body thick, short, and soft as velvet, and his walk firm and steady.

The cow should be high of stature, her horns well spread, fair and smooth, her forehead broad and smooth, her body long, her belly round and large, and her udder white, not fleshy, but large and lank, with only four teats; these having been experienced to yield the most milk. She should also be young; and some hold it to be most adviseable for her to be of the same country as the bull, and as near as can be of the same colour.

The cow reaches the age of puberty at eighteen months, and the bull at two years; but though they are at that age capable of generating, it is adviseable not to suffer them to copulate under three years. The time of their greatest strength is from three to nine years, after which the best way of disposing of them is by fattening them for slaug-

ter. As they acquire the greatest part of their growth in two years, the duration of life with them, as with most other species of animals, is nearly seven times two years; and accordingly we seldom find them live above fourteen or fifteen.

Cows often retain at the first, second, or third time of covering; and when they are pregnant, the bull refuses to cover them again, whatever appearance of heat there may be in them. Indeed, their heat generally ceases almost immediately after they have conceived, and they themselves will not then suffer the bull to approach them.

Cows require greater care when pregnant than at other times; particularly, they should not then be suffered to leap over hedges, ditches, &c. or to do any other thing by which they may strain themselves; for they are subject to abortion: consequently they must not by any means be used for draught whilst in that condition; but they should then be put into the richest pastures, provided they be not too moist or fenny, and for six weeks or two months before they calve, they should be fed more plentifully than usual; giving them in the summer-time grass in the cow-house, and in the winter bran, lucerne, sainfoin, burnet, &c. During this time they must not be milked, that fluid being then absolutely necessary to the nourishment of the foetus. Some cows, indeed, do not yield any milk for a month or six weeks before they calve; but those which have milk to the time of calving are both the best mothers and the best nurses; though it is generally bad and in small quantity. The same care and cautions must be observed at the delivery of the cow, as at that of the mare; or rather more, the former seeming to be on this occasion more spent and weakened than the latter. One indispensable point is, to put her in a separate stall, where she must be kept warm, at her ease,

and on good litter. She must be well fed for ten or twelve days after she has brought forth, with ground beans, corn, or oatmeal, diluted with water in which salt has been dissolved, and with lucerne, burnet, fainfoin, or good grass, thoroughly ripe. By this time she is usually recovered, and may therefore by degrees be put to her common way of living, and turned into the pasture; observing not to take any milk from her during the two first months, that the calf may thrive the better; and besides, the milk is not then of a good quality*.

As soon as the young calf is born, whilst the mother licks it, or to excite her to do so, it is right to strew over it a couple of handfuls of salt and crumbs of bread mixed together. This licking strengthens the calf, or at least clears it of all filth, which could not be removed by any other means, because the young creature is then too tender to be handled without danger; and at the same time it should be made to swallow the yolk of a raw egg, likewise to give it strength.

The young calf should be left with its dam during the first five or six days, especially if it be in winter, in order that it may be kept constantly

* Good milk is neither too thick nor too thin; its proper consistence is, when a small drop preserves its spherical form without spreading: it must also be of a delicate white; that with a yellow or blue cast being of little value. The taste of it must be soft, without any bitterness or acridity; it must have a good smell, or none at all. It is better in the month of May, and in summer, than in winter; and for it to be perfectly good, the cow must be of a proper age, and in good health. The milk of heifers is too thin; and that of old cows too oily, and in winter-time too thick. These different qualities of milk have relation to the butyrous, caseous, and serous parts of which it consists. Milk too thin abounds too much with serous particles; that which is too thick has few or none of these particles; and the too oily has not a proper portion of butyrous and serous particles. The milk of a cow when bulling is not good; nor that when the creature is near, or just past, the time of her calving. *Buffon, Nat. Hist. du Bœuf.*

warm, and suck whenever it pleases; and at the end of this time, by which it will have gathered strength and have grown visibly, it must be tied up in a separate pen at a little distance from her, that it may suck only when the keeper thinks proper; for it would exhaust the cow if left continually with her. Two or three times a day will now be often enough for it to suck; and when it has done sucking, it must be led back to its pen and tied up as before. After the mother is returned to pasture with the other cows, the calf should still be kept in the cow-house, and there made to suck twice day before its dam goes out.

If it be intended to fatten the calf speedily, and at the same time render his flesh fine and delicate, he should have every day about half a dozen raw eggs, and crumb of bread boiled in milk. This, in four or five weeks time, will render his flesh excellent. Calves intended for the butcher should therefore not suck above thirty or forty days; but those designed for keeping should be left with the dam two months at least, because the more they suck, the stronger and larger they will be. The best for bringing up are those that have been calved in the months of April, May and June; for those which come later seldom acquire vigour enough to enable them to bear the inclemencies of the ensuing winter; cold making them droop, and often killing them. Thus calves designed for keeping should be weaned at two, three, or four months: but before they are taken wholly from sucking, a little fine grass, or chopt hay, should be given them from time to time, to accustom them to this new aliment; after being used to which, they must be never suffered to come near their dam; either in the stall or pasture. They themselves should be sent to pasture every day, and remain there from morning to evening during the summer: but when

the cold of autumn begins to set in, they must not be let out till late in the morning, and should be brought back early in the evening; and during the winter, the cold of that season being extremely detrimental to them, they must be kept very warm in a close cow-house, be well supplied with water, have sainfoin, lucerne, burnet, &c. mixed with their common grass, given them in a cow-house, and be let out only when the weather is very fine. A great deal of care is necessary to bring them through the first winter, which is the most dangerous period of their lives: for if they survive this, the following summer will strengthen them so that they will have nothing to fear from the cold of a second winter.

It sometimes happens that a calf is troublesome to rear, because it will not readily take the teat, but must have it held a considerable time in its mouth before it will suck; and likewise some show for a long while a reluctance to suck at all, which is a sign of their having pimples under the tongue; a disorder to which young calves are subject, and which is easily cured by cutting them off with a pair of scissars, and washing the wound with vinegar and salt: others rub them with hog's lard and salt pounded very fine.

In Spain, and some other countries, they place near a young calf in a cow-house one of those stones called *salegres*, which are found in the mines of rock-salt: by licking this salt-stone whilst its dam is at the pasture, it becomes so hungry and thirsty, that when the cow returns, the calf eagerly seizes the teat and sucks his fill; and by this means he fattens and thrives much faster than those to which no salt is given.

The clods of curdled milk which are found in the third and fourth stomach of a sucking calf,

are, after being dried in the air, the rennet made use of for curdling milk. The longer it is kept the better it is: and a very little of it is sufficient to turn a large quantity of milk, as is well known to all who keep dairies.

As to the rest, the management of milk and dairies is a subject so generally and so well understood, that it might be needless for me to enlarge upon it here, any farther, perhaps, than just to observe in general, that the dairy should be kept extremely clean and well aired, at a distance from all disagreeable smells of any kind whatever, and that it should be so situated as to be of as equal a temperature as possible during the whole year, and therefore open to the north in summer, and to the south in winter. The dairy-maids should not only be clean in their persons, but also such whose perspiration is not rank. The vessels in which milk is now kept are generally lined with lead, because it is a substance that cleans easily: but great care should be taken that the milk do not remain in any leaden vessel till it contracts the least degree of acidity; for if it does, it soon dissolves part of the lead, a very little of which will be of extremely bad consequences to health, by occasioning the most dangerous disorders in the stomach and bowels, and often depriving people of the use of their limbs, as is daily seen in painters, and in those employed in making white-lead.

C H A P. V.

Of the Diseases of Horned Cattle.

THE treatment, as generally practised, in the several diseases of horses is, in similar cases, so applicable to the whole species of animals commonly distinguished by the appellation of Horned Cattle, that little remains to be added here, unless it perhaps be, to point out some few particulars more peculiarly relative to the management of these last. The Romans paid very great attention to them, as sharing with man the labours of the field; and as the climate of Italy is more kindly than that of England, surely whatever care was necessary there, cannot be less requisite here. The writers of that country may therefore properly become our guides again on this occasion.

Nature has clothed with thick furs, or warm covering, such creatures as she intended to be exposed to the severity of the cold: but as cattle are not sheltered with such defence, I really think it cruel to expose them too much to the inclemencies of the winter, as many among us are apt to do*. Such was not the practice of the Romans, who very expressly enjoin, that the ox, in particular,

* For, notwithstanding the very strong arguments used by M. de Buffon, in support of his opinion, that these creatures are original natives of those climates; such as, in particular, that they are not found beyond Armenia and Persia in Asia, and Egypt and Barbary in Africa, (for he looks upon the buffalo, the aurock, and the bisont, as creatures of a different species); I cannot but incline here to think somewhat differently from that great man, and that principally for this obvious reason: nature, as is evident, throughout the whole creation, gives to every animal a covering suited to the climate she intends it for; and that of the ox is plainly calculated for a warm region. It therefore seems to me not improbable, that our black cattle came originally from some more southern part.

be defended from the cold by a warm stable, and if it can be done, that there be a fire in it, which both Vegetius and Columella (*a*) declare to be of great advantage to this animal, as he thereby breathes a dry air, which carries off not only the exhalations from his own body, but also other noxious vapours. According to them, the manger should be so contrived that their food be not lost among their feet ; and their stalls should be placed on dry ground, with a gentle slope to carry off their urine, and kept constantly clean with dry litter, especially for the labouring ox. How different from these directions is the condition of too many of our farmers' yards where the cattle often stand knee-deep in dirt !

When the ox returns from labour, his neck should be washed, and rubbed for a long time ; his whole body too should be freed from clay or dirt, especially his feet, which should be well washed.

In summer, it is proper that cattle should stand in cool shades during the heat of the day, and in the night in the open air ; for they contract as many diseases by suffering too great heat, as by being exposed to too much cold.

It is of great benefit to them to give to each, about once a week, a raw egg, and some salt in a pint of wine or ale ; and to this may likewise be added bruised garlic, vervain, and rue.

Cattle do not require the clearest water, nor are they very much hurt by it if it is dirty ; nevertheless, it is the duty of the person who attends them, to see that they drink the best water, and such as is clean, and that they be well fed. There is no danger of their over-feeding themselves ; for when nature is satisfied, they lie down and chew the cud. Labour breaks, heat vexes, and cold pe-

nebrates an animal that is empty and exhausted, sooner than one that has been well fed: and surely no man will grudge them a sufficient, plentiful allowance of food, who considers how far the price of oxen which perish through want, exceeds the expence of that food.

If oxen are put upon running at their full speed, or if they are otherwise over-fatigued, at any time of the year, but especially in the summer, either they contract thereby a looseness, which proves pernicious to them, or slight fevers: for this animal, being naturally slow, and rather adapted to easy labour than that of swift motion, is grievously hurt, if forced to go beyond his strength.

Neither swine nor hens should come near their cribs; for when an ox has swallowed hen's dung with his food, he is presently tormented with violent pains in his belly; and when he swells with it he dies. In case of his having swallowed any, the best way is to give him three ounces of parsley-seed, half a pound of cumin-seed, and two pounds of honey, mixed together, and poured warm down his throat, to force him to walk, and to rub him heartily till the draught moves his belly. The ashes of any wood well sifted, boiled in a sufficient quantity of oil to render them liquid, and then poured down the ox's throat, will also be of great benefit against the bad effects of this sort of dung.

But if an ox swallows hog's dung, or more especially the filth which a sick sow has vomited, he is presently seized with so contagious a disease, that it speedily affects a whole herd. When therefore there is the least suspicion of this distemper, the cattle must be removed and separated to pastures where none such have been fed, that so they may not hurt one another: for by feeding they infect the grafts, and the water by drinking of it. An ox, though otherwise in perfect health, may perish by

the smell and breath of the diseased blowing upon him. When this happens, the dead carcase must be carried to a distance, and buried deep, lest the sound be infected by it, and the negligence of the owner be imputed (as is usually done by fools, says Vegetius) to the divine displeasure. In the case here spoken of, he recommends half an ounce of squills sliced thin, infused in a pint of wine, with about two ounces of salt, to be given every morning to each creature thus infected. But as infectious diseases will be the professed subject of the last part of this work, I shall not enlarge upon them here, any farther than just to mention the similitude which Mr. Osmer thinks there is between the distemper in horses and that amongst oxen.

“ To the best of my observation,” says he, “ what is called the distemper amongst the horned cattle, is exactly correspondent to the distemper amongst horses; the symptoms in each animal being similar in all respects. The discharge from the nostrils, &c. of the cow in these fevers, about the nature of which, and of this distemper, there has been abundance of fine writing, is nothing else but an extravasation of the serous particles of the blood, the effect of inflammation; and therefore in obedience to the attempts of nature, our business is to invent all the methods we can to carry off this extravasated serum; and incisions made in the skin of the cow, as is done for horses with the same sort of fever, produce in twenty-four hours a nasty, foetid, purulent matter. By a number of these drains the parts will be unloaded, and the animal relieved, as they do in all inflammatory fevers amongst horses; and I dare say will too amongst the cows, answer nearly the same end and purpose as a critical abscess. But when no critical abscess hap-

“ pens, or no artificial drains are made use of, the natural ones not being sufficient to carry off the extravasated serum, the viscera and more noble parts are, in time, affected, the blood and juices deviate by degrees into a state of putrefaction and corruption, and the animal dies a most wretched death.

“ If any man object and say, this distemper of the cows is infectious, and therefore it is of the putrid, and not of the inflammatory kind; I answer, that it does not appear to be infectious, because some cows, amongst a number of infected ones, have escaped it. But allowing it to be of the putrid or pestilential kind, and to arise from the air, infection, or both, these artificial drains made in the skin will be very proper, because they will answer in some measure the same end as the bubo or critical imposthume befalling the human species in pestilential disorders, if they are properly managed. And here it may be observed, that when distempered cows have escaped death, it has been generally owing to some critical abscess; various instances of which I have seen.

“ To these artificial drains should be added the use of cooling salts, and laxative glysters, if needful.

“ It is necessary ever to remember, that bleeding the horse or cow will be wrong, and must do harm, when a discharge from the nostrils, &c. is begun, because it is contrary to the effort of nature; and so it is when there is any swelling that is tending to matter, which kinds of swellings can be distinguished by the skilful only.”

Indigestion is very hurtful to oxen, and is known by the following signs: frequently belching, loathing of their food, noise in the belly, heavy eyes: the creature neither chews his cud, nor licks him-

self as usual. In this case, pour down his throat two gallons of water as warm as he can bear it, and soon after give him about thirty leaves of cole-wort boiled in water, and afterwards soaked in vinegar; and he must abstain from food for one day. Neglected indigestion brings on colics, which is to be treated, as the same complaint is in horses.

I shall here mention *boving*, a disorder which is almost peculiar to the horned cattle.

This disorder proceeds from a too sudden ferment in their green succulent feed, whereby the elastic air let loose by the fermentation, but confined by the hard faeces which do not readily enough give way to it, becomes highly inflamed. The gas arising from fermented liquor, which often proves mortal to those who breathe it. The method of cure should therefore be, clearing the great gut of hard excrement, injecting a stimulating glyster, and giving cooling things internally. This agrees with what M. Bourgelat proposes, when he says (*b*), "Thus it is, for example, that with nitre " given in half a glass of brandy, and often even " with emollient glysters only, we have saved con- " siderable numbers of oxen ready to expire in " their pastures, after vain endeavours had been " used to ease them, according to the common " practice, by many incisions made in the skin, " doubtless with an intention to disengage the cel- " lular membrane from the air that filled it, and " of which carinatives would inevitably have in- " creased the disorder, and hastened the death of " the beast."

Farmers are apt to fall into a great error when their cattle have got the better of this disorder; and that is, by letting them become constive again, and consequently liable to a return of the same

(*b*) *École vétérinaire; Matière Médicale*, p. 112.

danger when they next feed on succulent plants; whereas were they to continue to give them green food after a purging has been once brought on, no farther inconvenience could ensue. Immersing them in cold water when thus distended brings on an immediate purging, and thereby saves their lives.

The mouths and tongues of horned cattle are subject to the same sorts of swellings as those of horses, and alike productive of an inability to eat.

These should also be cut off with a knife or scissars, and then rubbed with salt and let heal. If they have no appetite to their food, and yet no signs of indisposition appear, it will be proper to rub their chops with salt and garlic beaten together, or with some other stimulating substance.

The cure of internal diseases in cattle is so nearly the same as for horses, and the doses of their medicines so much alike, that a repetition of them here seems needless. The causes of their lameness, and the methods of curing them, are also similar; and the feet of both require so nearly the same cutting and care of the hoof, that the least degree of intelligence will suffice to vary them properly.

The castration of calves is likewise performed in the same manner as that of horses.

B O O K IV.

Of S H E E P.

C H A P. I.

Of the Qualities and different Kinds of Sheep.

“ **S**HEEP have golden feet, and wherever they set them, the earth becomes gold,” say the Swedes, by way of expressing their high estimation of this animal. In effect, there is not any one domestic creature which yields greater profit to man than sheep do. Their flesh, their milk, their skin, their intestines, their dung, in short, every part of them, is necessary for some use or other, and turns to good account.

Though their flesh and milk furnish us with variety of excellent food, yet their wool is the chief object, especially to a commercial nation; for of it is formed, in Britain, the staple-commodity to which we owe the wealth and grandeur that render us the arbiters of power in Europe.

At the same time that this creature is the most useful, it is also, in itself, one of the most defenceless against enemies: providence intending, as it would seem, that it should owe its very existence to our care, and be entitled to our protection, in return for the means of enjoyment and wealth which it affords us: for it not only wants protection but care also, more than any other domestic animal. Sheep are of a very weakly constitution; much fatigue exhausts them; they can ill bear ex-

tremes of heat or cold; their diseases are many, and most of them contagious; and their yeaning is attended with difficulty and danger.

They are said to be sensible to the charms of music, so as to feed more assiduously, to be in better health, and to fatten sooner by the sound of a pipe: but perhaps it may be more rightly thought, that music serves to amuse the shepherd's tedious hours, and even that the origin of that art was owing to this solitary life.

Sheep love their keepers and those who take care of them; they follow them, and obey their voice. It must however be observed, that if the shepherd has not a watchful eye over them, one or other of his sheep may easily stray from the rest of the flock, wander into places it is unacquainted with, and there fall down a precipice, or tumble into a hole or ditch, especially if the creature has been frightened, which sheep very easily are; for when they have once lost their way, they run strait on, without stopping, and always directly against the wind, particularly if it blows hard, and they chance to be in an open place, a wide road, or on the borders of the sea. They are very fond of light, and never thrive well in dark places; and such is their fondness for society, that frequently a sheep left alone will pine away, become emaciated, and quite lose his strength.

The re-establishment of the best kinds of sheep in England, and greater care of their fleeces, are objects well deserving the attention of government: for, notwithstanding all our boasted improvements, it is certain that the quality of our wool in general has been on the decline for some time past*. These

* Mr. Lisle, whose judgment and veracity in matters of this kind stand unimpeached, tells us, in his *Observations on Husbandry*, article *Sheep*, that, even so late as his time, and he has not been dead many years, the clothiers complained that our Herefordshire wool, and particularly that of our great staple, was no longer so fine as formerly.

useful creatures, which were the chief wealth of former ages, become of still greater value as art and industry increase among us. One cannot, therefore, but be astonished at the indifference into which this nation has fallen with regard to her sheep, and especially too at a time when every other country is exerting its utmost endeavours to improve its breed, and the manner of managing its flocks. At this very instant, we are strongly called upon to be particularly attentive to this great object, by the measures which the French are indefatigably pursuing to improve the breed of their sheep, by introducing those of every country where they excel.

We have no particular accounts of what our sheep were in antient times; though we may presume that our wool was always sought for by foreign manufacturers, because our history informs us, that the duty paid on the exportation of it was a considerable article of the royal revenue*.

If we take a general view of the whole of England, we shall find, that the temperature of our climate, and the quality and almost perpetual verdure of our pastures, render it one of the best situated countries in the world for raising flocks of sheep. We are free from every discouraging circumstance with regard to them. We have no armies of insects or reptiles that are enemies to them; no wolves, nor any other animal whose nature is to prey upon them, if we except foxes, of which again the numbers are scarcely more than

* In former times, "the wealth of the nobility, gentry, and monasteries consisted chiefly in wool, which also then made the bulk of private property at home. It was at the same time the prime article in commerce. Aids to the crown was granted therein. It supplied the demands for the support of armies, the payment of subsidies, and all other expences incurred on the account of the public in foreign parts," says the learned Dr. Campbell, in *vol. II. p. 152*, of his excellent *Political Survey of Great-Britain*.

suffice to give proper healthy exercise to men, who might otherwise indulge themselves in too much ease. Our frost and snow are generally of short continuance. Our extensive downs, our hills, the sides of our mountains, and even our steep rocks, abound in fine grass, which feeds a smaller breed of sheep; whilst our richer pastures of Lincolnshire and Ely maintain those of a larger size: and we are surrounded with a sea-coast, the air of which is thought to be particularly favourable to the health and thriving of sheep, as well as to the fineness of their wool. The air of the sea is found to be so wholesome and favourable to sheep, that the husbandmen who live at a distance from that element, find their advantage in recruiting their flocks with sheep from near the sea.

Columella (a) mentions the several kinds of sheep most in repute in his days, and gives an instance of the judgment of his uncle, M. Columella, an excellent husbandman, in mending the breed of his own sheep, by coupling with them rams brought from Africa: and indeed it is highly probable, that the excellence of the Spanish wool, now so justly valued, took its rise from combinations of this kind during the long residence of the Moors in that kingdom.

Don Pedro IV. King of Castile, was the first prince who introduced the good kind of sheep which they now have in Spain, by bringing thither the Barbary breed. In two ages, they began to decline, when Cardinal Ximenes restored the breed, by procuring a fresh supply of rams from Barbary, that is to say, of rams bred by the Arabians, thereby exciting amongst the people an emulation which continues to this day; and by fixing their attention to this object, which

has hitherto preserved the goodness of the Spanish wool*.

The memoirs of the Royal Society of Agriculture at Rouen say (*b*), that in the fifteenth century, our Edward IV. obtained a number of this race from the king of Castile, which thrived very well, and laid the foundation of the excellency of our wool. Henry VIII. and Queen Elizabeth, contributed much to its perfection, by directing the attention of government to this great national concern. Men of distinguished judgment and integrity were commissioned to superintend the proper distribution and future care of the Castilian sheep. How this commission has since come to be neglected, I know not. These commissioners sent two Castilian ewes and one ram to every parish in which the pasture was thought proper for them; and the care of them there was intrusted to the yeomen and most considerable farmers, to whom peculiar privileges were at the same time granted on this account. Farther, in order the sooner to have a quantity of good wool, the finest native ewes were also singled out, and covered by the Spanish rams, from whence proceeded a bastard race, much superior in quality to those of that country. Shepherds were taught the art of managing sheep, and written instructions were given them, which, I am sorry to say it, are now lost†.

* The finest of the Spanish wools are those of Castile, which are divided, according to the places of their growth, into Segovians, Leonias, Segovias, Sorianas, and Molinas. The wools of Arragon are less fine: these are Albarazins, fine and middle, the Campos, and the black wool of Saragossa. Portugal and Navarie produce also fine wools. Our imports of wool from Spain have generally been of the prime of the Castilian, used in making our finest cloths.

(*b*, Tome II p. 58.

† Dr. Campbell, in his very valuable *Political Survey of Great-Britain*, vol. II. p. 151, treats the whole of this account of Edward the Fourth's, or any other of our kings, procuring sheep from Spain, to renew or improve our breed, as a mere fiction, invented by P. Chomel, in his

At this time began the custom of folding them in the warm, kindly weather; and the same practice was afterwards continued during the winter. The abode of the Spanish sheep in England altered by degrees the nature of their wool: it became much longer, but did not continue so fine as before; owing, probably, to the difference of the pasture. Our wool is however whiter and cleaner than that of Spain, through the great care which the English take to keep their flocks free from filth; an attention hitherto neglected by the Spaniards.

Dictionnaire Oeconomique, to show how easily such a scheme might be executed in France; and I confess that the Doctor's arguments seem to me next to absolutely conclusive against it: indeed, if it rested solely upon the credit of Father Choinel, I should not hesitate a moment to pronounce him right. But as it comes to me from an infinitely more respectable quarter, from a society justly revered by the whole world, some of whose members are nobles of the first distinction, and others highly eminent for their great knowledge, I cannot suppose them to have taken this upon trust from the Dictionary-writer, or to have advanced it as a fact, without better authority than his for so doing. The Gascon and Norman Roll, published by the late Mr. Carte, are a proof, not to mention several more which might be instanced, that there may still be in France, and particularly in those parts of it which once were subject to us, records relative to our history which we are yet unacquainted with; and it is not impossible that the anecdote here alluded to may be one of them, even though the name of the prince, and the date, may be mistaken. However, I speak here only from surmise. Let me now use an argument which may possibly be more striking. The Doctor himself, adopting the opinion of those who think that the Northern parts of this island were peopled from Germany, the Soathern from Gaul, and the Western and Ireland from Spain, says, p. 150, "it cannot be doubted, that as the inhabitants of Britain and Ireland, so the sheep also came originally hither from some other country, and most probably, for many reasons that might be assigned, from Spain." This seems to be confirmed by the breed being the same in both islands, and having a great resemblance unto those of Spain. Now, with submission to the Doctor, to whose opinion I shall ever pay a little deference, is it any way unreasonable to suppose, that the breed of sheep imported into this island at the time of its being first inhabited, might have degenerated, in the course of many centuries, so as to stand in need of a kind of renewal; and, in that case, could there be any more proper way than applying to the country from which the good breed first came? No matter which of our princes did it; or even whether it was not done at all. Some such expedient would be of service now to improve our present race.

To the above mixture of the Spanish sheep with the natives of this island, and the greater or less degeneracy of their posterity, is owing that we now see in England three sorts of sheep; the common, which are very small; the bastard, which are of a middle size; and the strong, fine and plentiful breeders.

The Gloucestershire, particularly those of Coteswold, the Herefordshire, Shropshire, and the isle of Wight sheep, yield the finest wool of any in England: they are short-legged, and have commonly a black forehead or a black head. The Warwickshire, Leicestershire, Buckingham, and Lincolnshire sheep, are the largest and best shaped, and their wool is the deepest of any we have, but not so fine as that of the former. The Yorkshire sheep are likewise pretty large, but their wool is coarse: and in general, that of all the Northern counties is long, but hairy. The Welsh sheep are the smallest of all, and their wool is by no means the finest; but in return their flesh is excellently well flavoured. The wool of the Castilian sheep is undoubtedly much finer than that of even the best English; but it is less in quantity, chiefly because the sheep themselves are smaller: though there are in some parts of Spain sheep larger and covered with more wool than any of the English. For their wool, the English are certainly the next best to the Spanish.

The Irish wool in general, but especially in Limerick, Kilkenny, Kerry, Waterford, Cork, and some other counties, is of the fine long combing kind, scarcely surpassed by any of the sort in England. This is the wool that is most acceptable in foreign parts, where they have short wool enough of their own, or may easily procure it from Spain and Portugal.

In the last century, the Dutch brought from the

East-Indies a race of tall sheep, long and thick in the body, with wool proportioned to the stature of the animal. This valuable breed has succeeded beyond expectation in the island of the Texel and in East-Friesland. One of these sheep yields a fleece of from ten to sixteen pounds of a fine silky wool, which the Dutch sell for English wool.

The Flemings also procured some of the same sort of sheep, which they breed about Lisle and Varneton, where they thrive well, and are known by the name of Flemish sheep.

The largest of these sheep are six feet long from head to tail. In Holland, they give four lambs in the year; whereas in Flanders they bring but two, of which the strongest is castrated in order to keep up the flock. Each of these likewise yields as far as sixteen pounds of wool. They would be preferable to those of the Texel, if the same care was taken of them, and if they were more numerous than they are. Most of the sheep about Lisle are a bastard race, proceeding from the Indian rams and the ewes of the country, and yield from six to ten pounds of wool, little inferior to that of the true breed. Their flesh is well-tasted and wholesome: a carcase of it weighs from ninety to a hundred and twenty-five pounds, and yields about thirty pounds of suet. They are in themselves the finest, largest, and strongest of any sheep. They require, indeed, a larger quantity of food; but on the other hand they are indifferent in regard to its quality: they are easily taken care of, naturally healthy, and if sick easily cured. Their wool differs little from that of England, only it does not so easily take fine colours. It is not so fine as it might be, for several reasons, the principal of which are, that they are seldom folded; that they are kept too warm in their houses during the winter: that the litter is not changed often enough, whereby it not only

dirts, but also gives a bad smell to their wool; and that sufficient care is not taken to keep them from hedges, bushes, and brambles, which not only tear off their wool, but scratch their skin, which, if not healed in time, degenerates into the scab.

The Swedes, after having tried in vain to mend the breed of their sheep in the reign of Queen Christiana, set the same design again on foot in the year 1725. They imported into their country a number of the best kinds of sheep from England and Spain, and put them under the management of skilful shepherds, to be treated according to their several natures. After the example of England, heretofore, they established schools for training up shepherds, who were sent from thence to the different parts of the kingdom; and those schools are continued to this day. They put the foreign rams to their native ewes, and from thence proceeds a valuable bastard race. By this care, Sweden now has, notwithstanding the rigour of its climate, wool which nearly resembles the English and Spanish. The French have, in several parts of their kingdom, numbers of sheep of the true Spanish breed, and they multiply there exceedingly; so that, as the authors of the *Maison Rustique* observes (c), it might be easy for them, by following the method formerly practised in England, to establish every where that race, which would yield twice or thrice as much profit as their own common sheep, as well in point of size, of the goodness of their lambs and rams, of fruitfulness, and of milk, as of the quantity and quality of their wool and skins.

The provinces of Berry and Beauvais are those in which the most and best sheep in France are reared. Those of Beauvais, and some other parts of Normandy, are the largest, and the fullest of

(c) *Tom. I. part I. liv. iv. c. 3.*

suet. In Burgundy, they are very good; but the best are those that are fed on the sandy coasts of the maritime provinces of France. In Poitou, Provence, the neighbourhood of Bayonne, and some other parts of France, there are sheep which seem to be of a foreign breed: they are stronger, larger, and have a great deal more wool than those of the common breed. These sheep are also more prolific than the others; it being nothing extraordinary for them to have two lambs at a time, and to yean twice a year. The rams of this breed, engendering with the common ewes of the country, produce an intermediate breed, partaking of the two from which it proceeds.

Some think that the present Italian sheep are the offspring of a mixture of the Asiatic and the European kinds. But be that as it may, there are in the Brescian (*d*), towards Mantua, sheep whose wool is indeed coarse, but of so quick growth that they are sheared three times a year, namely, in March, in July, and in November. It is true, they would not yield so great a quantity of wool in cold countries; but in warm ones they will, every where; and yet they are of so robust a constitution, that they fear neither rain, cold, nor even hoar frosts, but will feed at all times in the open field, provided the ground be not covered with snow. They yield plenty of milk during four or five months of the year, and excellent cheese is made with it. Another kind of Brescian sheep, called bastard sheep, but for what reason I know not, bears shearing twice a year, and is much esteemed, though smaller than the former. But the finest wool of all Italy proceeds from that kind of sheep which the Brescians call *gentili*, and of which numbers are fed in the Trentin, especially about the villages of Ghede and Montechiaro: but as these

(d) *Ibid. tom. I. p. 348.*

sheep are extremely difficult to rear and take care of, and as the fineness of their wool is owing to the climate and pasture of the country, they probably might not thrive elsewhere.

The wool of the Russian, Polish, and Tartarian sheep, is better than that of the common German sheep; and accordingly the Swedes make use of it in their manufactures of cloth, stockings, &c.

All the above-mentioned sorts of sheep certainly form but one greatly-diversified species, which in M. de Buffon's opinion (e) hardly extends beyond Europe: for as to those long and bread-tailed creatures so common in Africa and Asia, and to which travellers have given the name of *Barbary sheep*, they seem to him to be of a different species from our sheep; as do likewise the American vigonia and lama.

Daily experience proves that the European sheep in some degree alter their very nature; for instance, in Lincolnshire they are large, heavy, and slow in their gait. On the downs of Sussex, Wiltshire, and Dorsetshire, they are smaller, more hardy, and fleeter; and in the mountains of Wales they are still less of size, and so active as scarcely to be confined by any inclosures. If we extend our view farther, we shall find, that the kind which yields the softest and finest wool in Britain, when sent to the West-Indies, becomes hairy like a goat. It is also observed in North-America, that the quality of their wool depends much on the temperature and climate of the country: in some of the middle provinces, such as New-York, the Jerseys, &c. their wool is of so good a quality, that a sample of it sent hither some years ago sold for as high a price as our best; although this was only from a common tobacco plantation, where no

(e) *Histoire Naturelle de la Bretagne*.

care had been taken of it since America was first settled*.

* The fact here alluded to is mentioned in *The Present State of America*, p. 142; allowed by Sir J. Dalrymple, in his *Political Essays, 1. Colonies*, p. 263; and confirmed by a letter to the writer of this work from an eminent merchant in New-York, who says positively, " Our wool in general is better than the English: but how small is the quantity we raise! It is true, some late oppressive acts, as the sugar-act, stamp-act, and new duty-act on glass, paper, &c. raised a spirit in the country for manufactures, and double the number of sheep; but I affirm, that our wool was not a quarter part sufficient for our consumption. I have taken pains to get an account of the number of sheep of New-Jersey; and as they were formerly taxed, I believe it just, and that the whole number does not exceed one hundred thousand. These, at an average, yield about $2\frac{3}{4}$ lb. each, which is sold for about fifteen pence sterling a pound. This quantity will be under $3\frac{1}{2}$ lb. per head, for apparel and bed-clothes, and not near sufficient for their demand. The country-people, indeed, mix linen-yarn in their cloth, which helps out, and makes it very strong; yet, though every pound is worked up, the towns, villages, and iron-works, cannot be supplied, and depend on English cloth and stuffs. I think Pennsylvania keeps still fewer sheep. It is true Long-Island, and the islands in the Sound greatly exceed: but then the northern parts of the colony of New-York keep much fewer; so that, on the whole, they are not equal to Jersey.

" I have found from experience that no farming is more profitable than sheep, and now keep an hundred and fifty on the same farm where my predecessor kept but twenty-five. I estimate the profit from eight to ten shillings a-head per annum, and this on land that rents at two shillings sterling per acre. I would willingly increase my flock, but find my farm will not bear it; though, on four hundred acres of arable and meadow land, I only keep besides, eighteen head of cattle, thirty hogs, eight horses, and plough about eighty acres for summer and winter grain. I winter, indeed, thirty head more of young cattle, which I summer in the woods. The smallness of this flock will surprize a British farmer: but our fields do not yield like those of England; owing to our cold springs and hot summers, long droughts and heavy rains, bad husbandry and want of manure.

" To what I before said of our not having a sufficient quantity of wool, I will now add the prices which I actually paid for manufacturing a piece of cloth, three quarters of a yard wide.

New-York Currency. f. s. d.

| | | | |
|---|---|----|--------|
| " Spinning $2\frac{3}{4}$ lb. of wool, at 3s. 6d. per lb. | 4 | 2 | 3 |
| " Weaving 34 yards of cloth, at 1s. | - | - | 1 14 0 |
| " Fulling, pressing and dyeing 25 yards, at 1s. 6d. | 1 | 17 | 6 |
| " Wool, $2\frac{3}{4}$ lb. picked and cleaned, at 2s. 6d. | 2 | 18 | 9 |

f. 10 12 6

" Which is 6s. 3d. currency, or near 3s. 4 $\frac{1}{2}$ d. sterling per yard.

C H A P. II.

Of the Management of Sheep.

AS the size and welfare of the sheep, and the goodness of their wool, depend much on the nature and quality of their pasture, this becomes an article of the utmost importance to the husbandman, and therefore deserves a particular inquiry.

In order to their being rightly managed, the owner should be very careful what kind of shepherd he entrusts his sheep to: for the shepherd not only accompanies them to the field, but should also take care that they do not feed in improper places, improper, on account of the quality of the food and drink, as well as other dangerous circumstances. He should likewise be particularly attentive that no improper rams mix with the flock; to give immediate relief to those that fall sick, especially in lambing-time, and for this reason he should be well acquainted with their diseases. In

“ The cloth, after a few days wear, looked very indifferent. I
“ had it made up for myself, as most of the gentlemen here pique
“ themſelves in ſetting an example of wearing country-made cloth;
“ but we were under a necessity of buying English cloth for our negroes.
“ The reſtrictions being taken off our trade, we are returned to wear-
“ ing English cloth, and hope like cauſes will not oblige us to recur
“ to the ſame reſolutions. We are now convinced that we cannot hire
“ to make cloth under almost double what the English does coſt;
“ but at the ſame time farmers who have the labour done within
“ themſelves, and by this means employ the women, who would
“ otherwise be idle, will always make cloth for themſelves with ad-
“ vantage; eſpecially as it is laid to wear better: but we have not the
“ leaſt proſpect of making a yard for exportation.”—This letter was
written in December, 1773; the facts related in it may be depended
on; and the writer of this work moſt ſincerely wiſhes, that the long
and literal extract of it here given may tend in any ſense to rectify the
muſtaken opinions which, unappply, too prevalent. Such is his reaſon
for inſerting it here.

short, his presence and care should be so constant, that the sheep shall obey him out of a kind of love. He should be vigilant and circumspect, govern them with great clemency, and says Columella (*a*), who strictly enjoins the same rule to the keepers of all sorts of cattle, be more like a captain and leader than a lord and master. When he threatens them it should be with a loud shout and shaking his staff at them: but he never should throw any offensive weapon at them, nor remove to any great distance from them; neither should he lie down, or sit down, but, unless he be going forward, he should stand, to be the better able at all times to look around him, to see that neither the slow and big with young, whilst they loiter, nor the nimble, whilst they run before, be separated from the rest; lest either a thief or a wild beast deceive the heedless inattentive guardian.

We find by Columella, that it was an early custom to lead sheep to far distant pastures at different seasons of the year; and the Spaniards have still retained this practice, as will appear from the following abridgment of a judicious account of their manner of managing the royal flocks, transmitted by a gentleman in Spain to the late Mr. Peter Collinson, F. R. S.

“ There are two kinds of sheep in Spain, namely, the coarse-woollen sheep, which remain all their lives in their native country, and which are housed every night in the winter; and the fine-woollen sheep, which are all their lives in the open air, and which travel every summer from the cool mountains of the northern parts of Spain, to feed all the winter on the southern warm plains of Andalusia, Manca, and Estremadura. It has appeared from very accurate cal-

(*a*) *Lit. VII. c. iii.*

" culations, that there are not fewer than five millions of fine-woolled sheep in Spain; and it is reckoned that the wool and flesh of a flock of ten thousand sheep produce yearly about twenty-four reals a-head, which we may suppose to be nearly the value of twelve six-pences sterling*.

" Special ordinances, privileges and immunities are issued for the better preservation and government of the sheep, which are under the care of twenty-five thousand men, who, as the Spaniards express it, clothe kings in scarlet, and bishops in purple.

" These sheep pass the summer in the cool mountains of Leo, Old Castile, Cuença, and Ar-

* Of these, but one clear a-head goes to the owner yearly; three six-pences a-head go yearly to the king, and the other eight go to the expences of pasture tvthes shepherds, dogs, salt, shearing, &c. Thus the annual produce of five millions of sheep, amounts to thirty-seven millions and a half of six-pences a little more or less, of which about three millions and an half are for the owners, above fifteen millions enter into the treasury, and seven millions and a half go to the benefit of the public. Hence it is that the Kings of Spain call their flocks, in their ordinances, *The precious Jewel of the Crown.*

Formerly, this jewel was really set in the crown; for a succession of many kings were lords of all the flocks: thence that great number of ordinances, penal laws, privileges, and immunities which issued forth in different reigns for the preservation and special government of the sheep. Hence a royal commission was formed under the title of The Council of the Grand Royal Flock, which exists to this day, though the king has not a single sheep. Various exigencies of state, in different reigns, alienated by degrees the whole grand flock from the crown, together with all its privileges, which were collected and published in the year 1731, under the title of "Laws of the Royal Flock;" in a large folio, of about five hundred pages.

The wars and wants of Philip the First's reign, forced that king to sell forty thousand sheep to the Marquis of Iturbieto, which was the last flock of the crown.

Ten thousand sheep compose a flock, which is divided into ten tribes. One man has the conduct of all. He must be the owner of four or five hundred sheep; strong, active, vigilant, intelligent in pasture, in the weather, and in the diseases of sheep. He has absolute dominion over fifty shepherds and fifty dogs, five of each to a tribe. He chooses them, and chastises or discharges them at will. He is the *prepositus*, or chief shepherd of the whole flock.

“ ragon. The first thing the shepherd does when the
 “ flock returns from the south to its summer-downs,
 “ is to give the sheep as much salt as they will eat.
 “ Every owner allows his flock of a thousand sheep
 “ twenty-five quintals of salt, which the flock eat
 “ in about five months: they eat none in their jour-
 “ ney, nor in their winter-walk. It is believed,
 “ that if they stinted their sheep of this quantity,
 “ it would weaken their constitutions, and degrade
 “ their wool. The shepherd places fifty or sixty flat
 “ stones at about five steps distance from each
 “ other; he strews salt upon each stone; he leads
 “ the flock slowly through the stones, and every
 “ sheep eats to his liking. What is very remark-
 “ able the sheep never eat nor desire a grain of
 “ salt when they are feeding on land which lies on
 “ lime-stone: and as the shepherd must not suffer
 “ them to be too long without salt, he leads them
 “ to a spot of clayey soil, and after a quarter of an
 “ hour’s feeding there, they march back to the
 “ stones and devour the salt. So sensible are they
 “ of the difference, that if they meet with a spot
 “ of mixed soil, which often happens, they eat
 “ salt in proportion†.

“ Towards the latter end of July, the rams are
 “ turned in among the tribe of ewes, regulated at
 “ six or seven rams for every hundred ewes; and
 “ when the shepherd judges that these have been
 “ served, he collects the rams into a separate tribe
 “ to feed apart. There is also another tribe of
 “ rams which feed apart, and never serve the ewes,
 “ but are kept solely for their wool and for the
 “ butchery: for though the wool and flesh of
 “ wethers are finer and more delicate than those

† This shows how favourable for sheep those pastures are which lie on lime-stone, or chalk, as most in England do; for in the south of this island there is chalk almost every where, and lime-stone abounds in the north-west.

“ of rams, yet the fleece of a ram weighs
“ more than the fleece of a wether, who is likewise
“ shorter-lived than the ram: for these reasons
“ there are but few wethers in the royal flock of
“ Spain. The fleeces of three rams generally
“ weigh twenty-five pounds; and there must be
“ the wool of four wethers, and that of five ewes,
“ to make an equal weight. There is the same
“ disproportion in their lives, which depend on
“ their teeth: for when these fail, they cannot
“ bite the grass, and are of course condemned to
“ the knife. The ewe's teeth begin to fail after
“ five years of age, the wether's after six, and
“ those of the robust ram not till towards eight.

“ At the latter end of September they put on
“ the redding or ecce, which is a ponderous irony
“ earth, common in Spain: the shepherd dissolves
“ it in water, and dabs the backs of the sheep with
“ it from the neck to the rump. It is an old cus-
“ tom. Some say it mixes with the grease of the
“ wool, and so becomes a varnish impenetrable to
“ the rain and cold; others, that its weight keeps
“ the wool down, and thereby hinders it from
“ growing long and coarse; and others again, that
“ it acts as an absorbent earth, and receives part
“ of the transpiration, which would foul the wool,
“ and render it harsh.

“ Likewise in the latter end of September the
“ sheep begin their march towards the low plains.
“ Their itenerary is marked out by immemorial
“ custom, and by ordinances. Their journeys
“ are often so long, that the poor creatures go
“ six or seven leagues a day to get into open wilds,
“ where the shepherd walks slow, to let them
“ feed at their ease and rest: but they never stop;
“ they have no day of repose; they march at least
“ two leagues a day, constantly following the shep-
“ herd, till they get to their journey's end. From

" the territory called the Montana, at the extremity of Old Castile, from whence they set out, to Extremadura, is an hundred and fifty leagues, which they march in less than forty days. The chief Shepherd's first care is to see that each tribe is conducted to the same district it fed in the year before, and where the sheep were yeanned, which they think prevents a variation in the wool; though this requires but little care; for it is a known truth, that the sheep would go to that very spot of their own accord. His next care is to fix the toil‡ (in England hurdles) where the sheep pass the night, lest they should stray, and fall into the jaws of wolves.

" Next comes the time when the ewes begin to drop their lambs, which is the most toilsome and most solicitous part of the pastoral life. The shepherds first cull out the barren from pregnant ewes, which last are conducted to the best shelter, and the others to the bleakest part of the district. As the lambs fall, they are led apart with their dams to another comfortable spot. A third division is made of the last-yeaned lambs, for whom was allotted from the beginning the most fertile part, the best soil, and the sweetest grass of the down, in order that they may become as vigorous as the first-yeaned; for they must all march on the same day towards their summer-quarters. The shepherds perform four operations upon all the lambs about the same time in the month of March; viz. they cut off their tails five inches below the rump, for cleanliness; they mark them on the nose with a hot iron; they saw off part of their horns, that the

‡ The toils are made of Sparto, in meshes a foot wide, and the thickness of a finger. Sparto is a sort of rush which bears twisting into ropes for coasting vessels. It is so light as to swim; whereas hemp sinks. The English sailors call it bos.

" rams may neither hurt one another nor the
" ewes; and they emasculate the lambs intended for
" bell-weather, to walk at the head of the tribe.

" As soon as April comes, the sheep express,
" by various uneasy motions, a strong desire to
" return to their summer habitations. The sheep-
" herds must then exert all their vigilance to pre-
" vent their escaping; for it has often happened
" that a tribe has stolen a forced march of three
" or four leagues upon a drowsy shepherd; and
" there are many examples of three or four stray-
" ed sheep walking a hundred leagues to the very
" place they fed on the year before.

" In the summer sheep-walks I learnt that the
" three following opinions should be ranked among
" vulgar errors:

" 1. That salt-springs are not found in the high
" mountains, but in the low hills and plains only.
" The whole territory of Molina is full of salt-
" springs, and there is a copious one rising out of
" land higher than the source of the Tagus, and
" not far from it; which is one of the highest
" lands in all the inward parts of Spain.

" 2. The metallic vapours destroy vegetation;
" and that no rocks nor mountains pregnant with
" rich veins of ore are covered with rich vegetable
" soils. There are many iron, copper, lead,
" and pure pyritous ores, in these sheep-walks,
" where grow the same plants, and the same sweet
" grass, as in the other parts.

" 3. That sheep eat and love aromatic plants;
" and that the flesh of those that feed on the hills
" where sweet herbs abound, has a fine taste. I
" have observed, that when the shepherd made a
" pause, and let the sheep feed at their will, they
" sought only for fine grass, and never touched
" any aromatic plant, that when the creeping
" *serpillum* was interwoven with the grass, they in-

“ dustriously nosled it aside to bite a blaid of grass;
 “ and that this trouble toon made them seek out a
 “ pure gramineous spot. I obferved too, when
 “ the shepherd perceived a threatening cloud, and
 “ gave a signal to the dogs to collect the tribe and
 “ then go behind it, walking apace himself to lead
 “ the sheep to shelter, that, as they had no time
 “ to stoop, they would take a snap of stachas,
 “ rosemary, or any other shrub in their way: for
 “ sheep will eat any thing when they are hungry,
 “ or when they walk fast. I saw them greedily
 “ devour henbane, hemlock, glaucium, and other
 “ nauseous weeds, upon their iſſue out of the
 “ sheering-house ||.

“ The shepherd’s chief care now is, not to suffer
 “ the sheep to go out of their toils till the morn-
 “ ing sun has exhaled the dew of a white frost,
 “ and never let them approach a rivulet or pond
 “ after a shower of hail; for if they should eat the
 “ dewy grass, or drink hail-water, the whole tribe
 “ would become melancholy, lose all appetite,
 “ pine away and die; of which there have been
 “ frequent instances *.

|| Mr. Collinson’s correspondent observes very justly on this occa-
 ſion, that if sheep loved aromatic plants, it would be one of the greatest
 misfortunes that could befall the farmers of Spain: for that the num-
 ber there is incredibly great, and the bees suck all their honey, and
 gather all their wax, from the aromatick flowers which enamel and
 perfume two-thirds of the sheep-walks. He affiures us, that he him-
 self knew a parish-priest who had five thousand hives, and whose me-
 thod was cautiously to seize the queens in a ſmall crape fly-catch, and
 then clip off their wings. This obliged their majesties to ſtay at home;
 and he declared, that he never had lost a ſwarm from the day of his
 discovery, to the time of his relating this, which was five years.

* Hail-water is likewiſe ſo pernicious to men in the climate here
 ſpoken of, that the people of Molina will not drink their river-water
 after a violent shower of hail; experience has taught them the danger:
 but let it be never ſo muddy, and riſe never ſo high after rain, they
 drink it without fear. Perhaps this may be the unheeded cause of
 many epidemics in other cities.

“ The sheep of Andalusia, which never travel,
“ have coarse, long, hairy wool. I saw some in
“ Estremadura whose wool trailed on the ground.
“ The itenerant sheep have short, silky, white
“ wool; the fineness of which is owing to the
“ animal’s passing its life in the open air, of equal
“ temperature; for it is not colder in Andalusia or
“ Estremadura in the winter, than it is in the
“ Montana or Molina in summer. Constant heat,
“ or constant cold, with housing, are the causes
“ of coarse, speckled, black wool: and I do be-
“ lieve, from a few experiments and long obser-
“ vation, that if the fine-woolled sheep stayed at
“ home in the winter, their wool would become
“ coarse in a few generations; and on the other
“ hand, that if the coarse-woolled sheep travelled
“ from climate to climate, and lived in the free
“ air, their wool would become fine, short, and
“ silky likewise in a few generations.

“ All the animals that I know of, who live in
“ the open air, constantly keep up to the colour
“ of their fires. There are the most beautiful
“ brindled sheep in the world among the coarse-
“ woolled sheep of Spain. I never saw one among
“ the fine-woolled flocks: the free, but less abun-
“ dant perspiration in the open air, is swept away
“ as fast as it flows; whereas it is greatly increased
“ by the excessive heat of a number of sheep
“ housed all night in a narrow place. It fouls the
“ wool, makes it hairy, and changes its colour.
“ The swine of Spain, who pass their lives in the
“ woods, are all of one colour, as the wild boars.
“ They have fine, silky, curled bristles. Never
“ did a Spanish hog’s bristle pierce a shoe. What
“ a quantity of dander is daily scoured from the
“ glands of a stabled horse; the curry-comb and
“ hair-cloth ever in hand! How clean is the skin
“ of a horse that lives in the open air!

“ The shepherds begin to sheer their sheep on
“ the first of May, provided the weather be fair :
“ for if the wool were not quite dry, the fleeces,
“ which are close piled one upon another, would
“ rot. It is for this reason that their sheering-
“ houses are surprizingly spacious. I saw some large
“ enough to contain twenty thousand sheep in bad
“ weather, and which cost above five thousand
“ pounds sterling. Besides, the ewes are crea-
“ tures of such tender constitutions, that if they
“ were exposed immediately after sheering, they
“ would all perish.

“ An hundred and twenty-five sheermen are
“ employed to sheer a flock of ten thousand sheep.
“ One man sheers twelve ewes a day, and but
“ eight rams. The reason of this difference is,
“ not only because the rams have larger bodies,
“ stronger, and more wool; but also because the
“ sheermen dare not tie their feet as they do those of
“ the unresisting ewes. Experience having taught,
“ that the bold, rebellious ram will struggle, even
“ to suffocation; but when held captive under the
“ sheers, they gently lay him down, stroke his
“ belly, and beguile him out of his fleece. A cer-
“ tain number of sheep are led into the great
“ shelter-house, which is a parallelogram, of four
“ or five hundred feet long and an hundred wide,
“ where they remain all night, crowded as close
“ together as the shepherd can keep them, that
“ they may sweat plentifully, which, say they, softens
“ the wool for the sheers, and oils their edges.
“ They are led by degrees, in the morning, into
“ the spacious sheering-hall, which joins the
“ sweating room. The shepherd carries them off
“ as fast as they are shorne, to be marked with
“ tar: and as this operation is necessarily per-
“ formed upon only one at a time, it gives a fair
“ opportunity to the shepherds to cull out for the

“butchery all the sheep of the flock who have
“out-lived their teeth. The sheered sheep go to
“the fields to feed a little if it be fine weather,
“and they return in the evening to pass the night
“in the yard before the house, within the shelter
“of the walls; but if it be cold and cloudy, they
“go into the house, and are thus brought by de-
“grees to bear the open air.”

The above, or a similar practice, might be followed to advantage by the counties which border on Wales, or on the Grampian hills in Scotland: for in both those countries there is summer-pasture for a much greater number of cattle than they can maintain in the winter. In both, the pasture is not only dry and healthy for sheep, but they would likewise thereby avoid the great summer-heats to which they are at times exposed, even in this moderate climate.

In dry and high grounds, where the herbage is thick and fine, the sheep are much more healthy, and their flesh is of a much finer flavour than that of those which are fed in moist vallies and low plains; unless those vales be sandy, or very dry, or near the sea. These last are, indeed, the best of all, because the herbage there is naturally sprinkled with salt. Also the ewes fed on them yield more milk, and of a better taste.

Sheep should not, if possible, be suffered to feed on low, moist grounds, or such as have been lately drained, unless these are become very dry; and even then it should be only in the middle of the day. Grounds over which mineral or hard waters run are also prejudicial to them; as is likewise grass in which the webs or eggs of grass-hoppers, or other insects, are found; or in which the dung of rats or field-mice lies. When sheep are forced to feed on such pastures, it is adviseable to rub their mouths frequently with salt, and to have salt laid

for them in vessels, where they will greedily lick it one after another; for they are remarkably fond of salt, and nothing is more healthful when given in moderation.

The world is greatly indebted to the celebrated Linnæus for the inquiry which he has excited in regard to such plants as are agreeable or hurtful to each domestic animal. He has observed, in a dissertation intitled *Pan Suecus* (*b*), that sheep eat 387 sorts of Swedish herbs and plants; and that they leave 141 of them untouched, as being hurtful, or less nourishing, and therefore less suitable to their nature. A similar account of our English plants might be of great service to our husbandmen and owners of land, especially to such as are concerned in grazing.

Among other interesting observations, Linnæus remarks (*c*), that the milfoil, or yarrow, is a food which sheep are particularly fond of; and I have been told by a gentleman who had been at much pains to clear his ground of this plant, that having turned some sheep into a field where there yet remained a good deal of it, he was greatly surprised at finding the next day that the sheep had scarcely left a plant of it, but had eaten it quite down to the ground. He then lamented his former industry, and laid down as an easy rule, by which every one may judge what plants are most agreeable to the different animals, to observe which are those that they prefer on being turned into a fresh pasture, or what are the plants in common pastures which the creatures feeding there never suffer to raise to seed. Thus the milfoil never runs to seed but in places where sheep cannot get at it. It is the same with the chamomile, though so bitter a plant, and with the narrow-leaved plantain or

ribwort. These plants have another advantage attending them with regard to sheep, which is, that as they strike deep roots they retain their verdure the longer, and therefore deserve to be carefully cultivated by those who have flocks of sheep.

Burnet has, on all occasions, been found to be peculiarly pleasing and healthful to sheep. An instance of its being both happened to a gentleman of my acquaintance in the year 1766; the summer of which being extremely wet, sheep in general were much afflicted with the rot. This gentleman, very attentive to rural oeconomy, bought some sheep in the autumn of that year, which he put into a field of burnet, and killed them during the winter, as his family-consumption required. Every one of them was found to be in a perfectly sound state; whilst every sheep belonging to a neighbouring gentleman, and which had been part of the same flock, which was Welsh, was diseated. It was very remarkable too in these last sheep, that, though they had plenty of grass and turnips, they could not be confined; but the moment they were put into the field of burnet belonging to the former gentleman, they became perfectly quiet, and never endeavoured to stir from thence, though the gate was left open.

The common opinion that sheep hurt lucerne in the autumn by biting it too close, is without foundation; for the spring-shoots have no communication with those that remained in the autumn, but are quite fresh shoots issuing from the crown of the root. Lucerne is an excellent food for all sheep in the autumn, and particularly so for ewes and lambs in the spring.

Clover is a very succulent food for sheep, and these creatures are extremely fond of it; but if the shepherd is not attentive, it may prove dangerous to them. He should always turn them into the

clover with their backs to the wind, and not leave them too long in it. It is said by some, that the wind mixing with the clover, which they swallow greedily, swells them, and makes them die in a few hours: others believe that it is the venom of the reptiles which this plant attracts, that occasions these pretty frequent accidents: but, in truth, the cause of this swelling is undoubtedly the same as was before assigned for the hoving of cattle; and accordingly the remedy directed for it by the Royal Society of Agriculture at Rouen is, as soon as this misfortune is perceived to have happened to some of the flock, to throw cold water over their bodies, if it be at hand, or to pen them up so closely as to make them press strongly one against another. This will restore them to their natural state.

Sheep likewise readily eat turnips, and thrive upon them, when they have been accustomed to them early; but they do not relish this food when it has not been offered to them till after they are grown old; however, if they are kept fasting two or three days, most of them take to it; and when they have once tasted it, they become fond of it, and feed very kindly upon it. In some places people feed their lambs with turnips till the middle of April, though they then begin to run up to seed. Some parboil them a little at first, till their cattle, and particularly their sheep, are accustomed to them: but a lamb only three weeks old will, after it has once eaten of this food, scoop out a raw turnip with great delight. Parsley corrects the inconveniences which may arise from the too-great moisture and coldness of the turnips, and therefore should be given them in plenty when they are fed upon this root. The sheep also are fond of it.

Carrots are another excellent food for sheep, and these creatures are remarkably fond of them. One acre of these roots, well planted, will fatten

a greater number of sheep, or bullocks, than three acres of turnips, and their flesh will be firmer and better tasted. Parsnips are also another excellent and profitable food for them.

It is a custom in most countries, especially where the verdure of the grass is not so constant as in Britain and Ireland, to collect the leaves of trees during the summer, or before they turn yellow, for feeding all kinds of cattle, and particularly sheep; and when these are mixed with their hay, they have a good effect. Straw, especially of oats, cut and mixed with their hay, is also recommended during the winter. The bark of the branches of the fig-tree, and its buds, are likewise mixed with their hay in countries where that tree abounds.

It is undoubtedly most healthy for sheep to range at large; but as that is not in the power of every one, they should at least be kept as airy as possible.

We are so happy in the mildness of our climate in England, and in our safety from wolves, that our sheep lie out of doors all the year. Yet I cannot help thinking that they would be greatly benefited if there were at least sheds under which they might retreat in stormy weather: for though sheep are well cloathed by nature, yet when the rain is so constant and heavy as to soak through their fleeces, they become quite chilled, and that damp cold in them is frequently the cause of many disorders. It is said, that when they are enclosed in the narrow compass of a fold, they cherish one another by their mutual warmth: but this cannot give relief to the damp which each of them feels.

In climates less fortunately circumstanced than ours, the sheep are housed in winter, and fed chiefly with dry fodder. They are led out every day, unless the weather be very bad, though this

is rather to air and walk than to feed them. In winter it should be near ten in the morning before they are led out, and they should be brought back again early in the evening, after having had an opportunity of drinking. In spring and autumn they are led to pasture as soon as the sun has dispersed the hoar-frost or dew on the grass, and continued there till sun-set. It is sufficient that they drink once a day in these seasons; and when brought back they should find fodder, though in less quantity than in winter. It is only during the summer months that they can live entirely on the pastures, and they should then have water in their power twice a day. They may in this season be let out early in the morning; and in very warm weather they should be led to cool or shadowy places during the mid-day heat, which is found to be remarkably prejudicial, disordering their heads, and throwing them into vertigoes. In very hot countries, Columella advises, that they be led in the morning so that their backs be turned to the sun, and in the evening so that the head may be shaded by the body.

Many people doubt whether it be more profitable to fold sheep, than it is to let them range a field at large both night and day; on the principle that their dung and urine are in either case pretty equally spread over the surface of the ground. Custom has, however, given it in favour of folding; and I believe it will be found, that if equal numbers of sheep are confined during the same time in two fields, that in which they are folded will be the most effectually and most regularly dunged; and therefore I must incline to prefer folding.

In the heat of summer, the fold should be large enough to admit of the sheep lying at a moderate distance from each other: for, even in the open

air, a great heat is generated by the sheep when forced to be close together; and more than an ordinary degree of warmth should be avoided at all times. As the weather becomes colder, the extent of the fold may be diminished; but special care should be taken never to pitch it in a damp place, particularly in rainy weather, or winter; for nothing is so prejudicial to sheep as their being laid wet. On this account it is that in Sweden, since the late regulations there, they have in some provinces a kind of covered fold going upon wheels, so that it can be moved from one place to another: and I am persuaded, that if this practice was introduced, especially in rich, low pastures, a considerable advantage would attend it, particularly in preventing the rot and purging which sheep are liable to in wet weather.

Where the great degree of cold, or any other cause, renders it necessary to house sheep in the winter, their cotes should be built on a dry spot; the sheep should have sufficient room in them, and openings should be made in the upper parts to carry off the heated air: they should not, on any account, be made too warm, nor should the dung and litter ever be suffered to rise too high in them. The racks for the sheep should never be fixed to the wall, but hang from the roof, so that they may be raised or lowered at pleasure. They should never hang too high; because when the sheep are obliged to raise their heads too much, little bits of their food are apt to fall among their wool, which they intangle, and also in their eyes, where they bring on inflammations, and sometimes blindness. The rack should therefore not be higher than the flanks of the sheep. The roof of the cote should be covered with laths rather than with straw, or other such material, because the dust, chaff, or insects, falling from these last would damage the

wool. Spiders especially are very hurtful to sheep. The Swedes are so particularly careful in this respect, that they even white-wash the walls of their sheep-cotes.

When the winters are very severe, or the sheep are in great danger from ravenous animals, it becomes necessary to lodge them in houses, or cotes, during the winter (*b*). Such cotes should be built in dry and airy places, free from springs, and from the coming in of water any other way. Whilst the sheep are housed, great care should be taken that the cotes be not kept so close as to render the air in them too warm, and that the sheep have very sufficient room to lie down. In order to secure them from too much heat, the best way of admitting a supply of fresh air will perhaps be by windows in each end, near the roof; for it is known that the heated and putrid air ascends, and therefore it will be discharged by these windows; for there will be a constant current of air from the one to the other, as the wind shall happen to set. The sheep will, by this means, be kept cool, without having openings through which the wind would blow upon their bodies partially, and thereby occasion coughs and colds, as every one can testify from his own experience.

The proportion of space which Mr. Hastfer, an ingenious Swede, advises (*c*) as a rule in building these sheep-cotes, is to allow six feet square for each sheep*; the height should be proportioned to the extent of the building, and to the number of

(*b*) *Memoires de la Société Royal d'Agriculture de Rouen*, tom. ii.

(*c*) *Manierè d'élever les Bêtes à Laine*, part. ii. c. 2. §. 2.

* Three Swedish ells, says he, which make very near six of our feet; the Swedish ell being exactly 23 380 inches English measure.

Sheep; but there must be at least ten feet between the floor and the roof, so that when the depth of dung and straw shall amount to four feet, there may still remain an height of six feet for the heat to ascend in: for when the hot exhalations of the sheep have not sufficient room to ascend, they return back, and fall upon the lungs of the sheep, open their pores, and make them sweat more than ever. Consequently great care should always be taken to make these buildings high enough, and large enough to prevent such immoderate heat†.

A cote twenty feet long should be ten feet high; that is the proportion for small cotes: but to twenty feet more in length there must always be added two feet more in height; that is to say, that for forty feet of length there must be twelve feet of height, and so in proportion for larger sizes. The breadth is generally half of the length: that is the best symmetrical proportion, and gives the greatest strength to the roof: though Mr. Hatsfer would have them rather exceed the above dimensions in point of height, because that contributes greatly to keep the air purer than it would otherwise be, and nearer to the temperature of a cool summer's day, or a fine clear day in autumn, which is the degree of warmth most to be desired, and that for the following reasons in particular:

“ 1. In the spring, when the cold is greater abroad than in the cote, it is wrong to keep the cote too warm, because the sudden change from heat to cold is too sensibly felt by the sheep, has an influence on their blood, and necessarily affects their strength and health.

† A cote twenty feet square is large enough for thirty sheep; and a cote sixty feet long and thirty feet wide is sufficient for an hundred and fifty sheep, including rams and lambs. Any one may of course form his calculation from hence. HATSFER. *Manière d'élever les Bêtes à Laine. Part ii.*

“ 2. In winter, the sheep, by passing suddenly from hot to cold, and from cold to hot, cannot but get coughs.

“ 3. It is plain, that if too great perspiration is hurtful to sheep in summer, when fresh grafts gives them the most strength, it must be much more so in winter, when they eat only dry hay, or even straw, which affords them less strength, and less nourishment; especially as the heat, which ought to prevent, or at least moderate, the bad effects of the superfluous humours, is at the same time evaporated and wasted.

“ 4. The heat which penetrates through the pores into the gross winter’s wool, makes it grow too much: now this wool is not only of less value than the other good wool which the sheep are to keep till shearing-time; but it falls off of its own accord as soon as the sheep pass from the cote into the cold spring air; and then this loss of their wool causes illneses in them, and even death.

“ The floor of the sheep-cote should be paved either with stones, or with bricks or clinkers, and raised a little archwise in the middle, in order that the urine of the sheep may run off easily on all sides through small holes made for that purpose at the bottom of the building. Some cover this floor with earth, and others with sand, to the depth of five or six inches, in order that the urine of the sheep may soak into it, and thereby render it fit for manuring of land. The floor itself may indeed be made of sand, as is the practice of some; and in that case, instead of raising it in the middle, it should be somewhat lower there, in order that the urine may penetrate thoroughly into the sand; and when it is sufficiently impregnated, it is covered with new sand, or thrown out of the cote with the dung of the sheep, and laid up in a heap for manure.

“ It is likewise to be observed, that of whatever height the cote may be, the dung in it should never be suffered to increase to more than four feet deep: for which reason the sides of the cote should be lined with wood to that height in the inside. The cote should be more or less high in proportion to the number of sheep kept in it; for by this means the heat will be more or less great, as it will rise to a greater or less height.

“ In whatever manner the floor of the cote is made, it should always be covered with fresh straw before the sheep are put into it; as well for their pleasure as for their health. By this means too their wool is preserved from filth; and when the floor is made of wood, as is also the way of some, the straw preserves the sheep from having their skin or their flesh hurt by splinters, or their wool by turpentine in the boards. This straw must be removed from time to time, and in some cases pretty often. Care must likewise be taken that there be neither splinters nor turpentine in the side-linings towards the bottom; for which reason the wood used there, and indeed as high as the sheep could reach from the top of the greatest quantity of dung that ought to be in the cote, should not be touched with either axe or plane, but left in its natural round form, with only the rough bark thoroughly peeled off it, and the wood then left for some time to dry in the sun, in order that all its resinous parts may be exhaled. Such is the method of the Swedes when they build cotes of this kind.

“ Besides the above-mentioned windows at each end of the cote, intended chiefly to purify the air in it, there should likewise be other common windows at convenient distances in the sides of this building; because, as was before observed, sheep are fond of much light, and never thrive well in dark places.

“ Their fodder should stand in ricks near the cotes, and be kept as free as possible from dust and all other impurities.

“ The sheep in the cote should be foddered in cribs made for that purpose, as well for the sake of saving, as to prevent the falling of any thing upon their wool; and for this reason these cribs should be placed in the middle of the cote; for if any hay chances to fall upon the sheep, they pull off each others wool in trying to eat it.

“ The cote thus built, however small it be, must be divided into two parts at least, in order to separate the sick sheep, or such as are ready to lamb, from those which are not in either of these cases: but they who would have a perfectly complete building to house their sheep in, should divide it into several compartments, in proportion to the number and kinds of their sheep, and according to the other circumstances attending them. These compartments may be made of whatever size is thought most proper, provided the sheep have but room enough in them. Or, which would seem to be an improvement on Mr. Hafner’s plan, the cote should rather be built separate, because then, besides the more effectual parting of them in case of need, each kind of sheep will naturally go to the home where they are fed.

“ Besides the above-mentioned compartments, it is necessary to have a moveable crib, about four feet high, going upon four wheels of seven or eight inches diameter each, to be drawn from one place to another. The use of it is to bring the sheep close up together in a small compass, when one would either make them sweat, or count them over. By this means their rubbing one against another, by which they lose a great deal of wool, is avoided.

“ It is likewise necessary to have a small build-

ing separate from the common cote or cotes, to keep apart such sheep as are attacked with contagious diseases, in order that their breath may not infect the others.

“ As to the colour of the sheep-cote, some would have it to be white, or of the colour of the wood it is built of, in order that the sheep big with young may not see in it any thing to surprise them.

“ The best covering, or roof, is that which is made of straw or holly. The roofs made of boards are apt to warp, and let in the air through their crevices.

“ Great care must be taken to preserve the cote free from spiders and their webs.

“ The outside should be smooth, and free from every kind of glutinous substance, at least as high as the sheep can reach, lest they should rub themselves against it, and thereby tear off their wool.

“ There should be gutters all along the lower part of the roof to receive and carry off rain.

“ As soon as the cote is finished, it should be fumigated in the inside, by burning in it hoofs or horns of cattle rasped, the hair of cattle, woollen rags, brimstone, and boughs of juniper with their fruit on.”

Mr. Hafser’s above directions appear to be chiefly calculated for a woody country: but where stones are plentiful, the walls will be best built with them, and tiles and slates will make proper covering for the cotes.

A certain fixed time of the year cannot be observed in all countries for shearing of sheep, because the summer does not advance equally in each of them. The best way therefore is to be directed by the weather, so that the sheep may neither suffer by the cold when stripped of their wool, nor be injured through too great heat by being made to

wear it too long. After they are shorne, they should be anointed with something that will destroy any remaining vermin. Columella (d) recommends for this purpose a strong decoction of lupins, lees of wine, and the dregs of oil, of each equal quantities, mixed together. Some use a decoction of tobacco in salt water. After the skin has been soaked with one or other of these liquors for three days, the sheep should be washed in the sea, if near; otherwise in water in which salt has been boiled.

The wethers have generally more wool than the ewes, and it is also better. That of the neck and the top of the back is prime; that of the thighs, tail, belly, throat, and head, is not so good; and the worst is that which is taken from dead beasts, or such as are sick. White wool is also preferred to the grey, brown, and black, because it will take any dye. Strait wool is better than curled; and it is even said that the sheep whose wool is too much curled are not in so good a state of health as those whose wool is straiter.

The general colour of sheep is a dirty white, or pale yellow: there are also many of a blackish brown, and not a few spotted with a yellowish white and black.

The flock should be examined every year, in order to pick out such as begin to grow old, and are intended for fattening; for as these require a different management from the others, they should then be formed into a separate flock. They should be led abroad in summer before the rising of the sun, that they may feed on the grass whilst it is yet moistened with dew; for nothing forwards the fattening of wethers more than a great quantity of moisture: and a, on the other hand, nothing obstructs it more than too much heat, they should be

brought home, or at least driven to a shady place, at about eight or nine in the morning, before the sun begins to be too powerful, and salt should then be given them to excite thirst. About four in the afternoon, they should be led a second time into cool and moist places, and be again made to drink as much water as they can before they are either housed or folded at night. Two or three months of this management will give them all the appearance of being full of flesh: indeed they will be fattened as much as they can be: but as this fat proceeds only from the great quantity of water which they drink, it may properly be looked upon as no better than an œdema, or bloated humour, which would in a short time turn to the rot; the only means of preventing which is to kill them whilst in this state of fatness: though even then their flesh, far from being firm and juicy, is extremely insipid and flabby. To render their flesh perfectly fine and good, they should, besides feeding on the dew and drinking a great quantity of water, have at the same time more solid food than grass. To this end the shepherd should also, in the season, turn them, into the fields, to glean, as soon as the corn has been taken off. They may be fattened in any season, even the winter not excepted, by only keeping them apart in a sheep-cote, and feeding them with good hay, meal, or barley, oats, wheat, beans, &c. mixed with salt, to make them drink the more copiously. But in whatever manner, and in whatever season they are fattened, they must be disposed of immediately; for they cannot be fattened twice, and if they are not killed by the butcher, they will die by diseases of the liver. Three months are at all times sufficient to fatten them; but less will do near the sea.

Ewes fatten very fast near their pregnancy, because they then eat more than at other times: but

their flesh, and especially that of an old ewe, is flabby and insipid. That of the ram, though he has been knit before fattening, is always rank and ill-flavoured. The flesh of the wether is by far the most succulent, and the best of all common meats.

The proper time for castration is when the lambs are five or six months old, and the weather mild. The best way of performing this operation is by incision. The testicles, which are easily separated from the bag, are then drawn out at the wound, and cut off. The lamb will probably be sick and dull for a little while after the castration, and therefore it will not be improper to give him for two or three days a small quantity of salt, to prevent a loss of appetite, which this operation often occasions.

The antiquits tell us that all ruminating animals have suet; but this is strictly true only of the goat and sheep, and that of the sheep is in greater quantity, whiter, drier, firmer, and of a better quality than the other. Fat differs from suet, in that it continues always soft; whereas suet hardens as it grows cold. It is chiefly about the kidneys that the suet is found; and, as was before observed of the horned cattle, the left has always more of it than the right. There is also a great deal of it in the cawl, and about the intestines; but this suet is far less firm and good than that of the kidneys, the tail, and other parts of the body. Wethers have no other fat than suet; and so predominant is this fat in their constitution, that all the extremities of their flesh are covered with it. Their very blood is not without it; and the seminal lymph is so saturated with it, as to appear of a different consistence from that of other animals.

C H A P. III.

Of the Propagation of Sheep.

THE ram is capable of generating at eighteen months, and a ewe may yean at the end of a year: but it is better to stay till the ewe be two, and the ram three years old; for the produce of these, if too early, or even the first at any time, is always weak, and of a bad constitution. One good ram will suffice for twenty-five or thirty ewes.

The qualities required in a good ram are, that he be strong and comely: his head must be large and thick; his forehead broad, round, and well rising; his eyes large and black; his nose short; his neck thick, and arched like that of a fine horse; his body long and raised; his shoulders, back, and rump broad; his testicles large, and his tail long; his legs small, short, and nimble: he must also have horns; for those which have not any, as is the case of some, are very indifferent creatures for breeding, at least in climates like our's. The best rams are white, with a large quantity of wool on the belly, tail, head, and ears, quite down to the eyes; and particular care should be taken that neither the mouth nor tongue be either black or speckled, because the wool of the lambs would most probably partake of this defect.

The best ewes for propagation are those which have most wool, and that close, long, silky, and white; especially if they have also a large body, a thick neck, and an easy, light gait.

The natural season of the ewe's heat is from the beginning of November to the end of April; but

they may be brought to conceive in any season, by giving them provocative foods, such as bread made of hemp seed, or oatmeal, oil-cakes, &c. and water in which salt has been diluted. Each ewe should be covered three or four times, and then separated from the ram, which always prefers the older sheep, and neglects the younger. In the season of copulation, they should not be exposed to rain or bad weather; wet hindering their retention, and a clap of thunder often producing abortion. In a day or two after they have been covered, they should be returned to their common diet; and not have any more salt-water; because the continual use of this, as well as that of hemp-seed bread, or other hot aliments, would infallibly cause abortion: but they may always be given to the ram for some time before he is put to the ewe. Ewes go five months, and yean at the beginning of the sixth. They seldom bring more than one lamb at a time. In hot climates they yean twice a-year, but in colder countries only once. Those which are rather lean than fat, bring forth most easily.

Some put the ram to their ewes about the end of July, or the beginning of August, in order to have lambs at Christmas, or early in January: but then they run a hazard of the lambs being destroyed by the cold, for they are extremely tender creatures. However, the ram is given to the much greater number in the months of September, October, and November; and lambs are accordingly to be had in plenty in February, March and April. They are also to be had in May, June, July, August, and September; there being no scarcity of them but in October, November, and December.

When a ewe is near yeaning, she must be separated from the flock, and carefully watched, in order to her being assisted, if needful; for the lamb often presents itself crook-wise, or with its feet fore-

most, and in either of these cases the ewe's life would be in danger if she were not helped. As soon as the lamb is weaned, it must be railed on its feet, and at the same time all the milk in the ewe's udder should be drawn out, because it is vitiated, and would be very noxious to the lamb, which must therefore be kept from sucking till the udder is replenished with fresh milk. The lamb must be kept warm, and should be that up with its dam for three or four days, that it may learn to know her. During this time, the ewe should be fed with good hay, barley-meal, or bran mixed with a little salt: and her drink should be water, the chill of which has been taken off, mixed with a little flour, bean-meal, or ground millet. At the end of four or five days she may be gradually brought back to the same kind of food as the other sheep, and be returned to the flock; only taking care that she be not driven too fast, nor too far, lest her milk should be heated: and some time after, when the sucking lamb shall have gathered strength, and begins to play, it may be left to follow its dam to the pastures; no farther care being then necessary; for it will find its dam amidst a very numerous flock, and seize her dug, without ever being mistaken.

Lambs weaned between the beginning of October and end of February must be kept in the house, on account of the cold, and be suffered to go out only in the morning and evening to suck; but about the middle of April they may be turned into the open fields. Some time before this is done, a little grafts should be given them daily, in order to accustom them by degrees to this new food. They may be weaned at the end of one month; but it is better to let them continue to suck for six weeks or two months.

The largest, most vigorous, and thickest-fleeced lambs, especially if their wool be all white and with-

out spots, are the best for keeping. Those of a weakly appearance are generally disposed of to the butcher. Lambs of the first yeaning, as before observed, are never so good as those of the following: and it is a general rule with all good husbandmen, rather to bring up the young of their cattle of every kind, than to sell them off when young; the profits in the former case being by much the most considerable.

The ewe yields, during seven or eight months, plenty of milk, which is good food for children and peasants. It also makes good cheese, especially if mixed with that of cows. Ewes may be milked twice a day in summer, but only once in winter, viz. immediately on their going to pasture, or at their return.

Ewes eat more during their pregnancy than at other times, and accordingly they then fatten very fast: but they are also then very apt to hurt themselves, so as, frequently, to miscarry, and sometimes to become barren from that time: nor is it very extraordinary for them to bring forth monstrous productions. If no accident befalls them, and they are properly tended, they are capable of yeaning during their whole life; that is, to the age of ten or twelve years: but generally they break and become sickly when they are turned of seven or eight. A ram lives to twelve or fourteen years; but is no longer fit for propagation after eight: he should therefore then be knit, and fattened with the old sheep; though even then his flesh will be rank and ill-tasted: that of an old ewe is at best flabby and insipid: the flesh of the wether is most succulent, and the wholesomest of all common meats.

C H A P. IV.

Of the Diseases of Sh. ep.

A Shepherd well versed in feeding his flock properly during the different seasons of the year, and skilled in the methods of curing the several disorders to which sheep are subject, is a very valuable person, and therefore should be sought for with the utmost diligence; for on his care and abilities the welfare of the flock greatly depends. How injudiciously then do they act, who resign the care of their sheep to boys, or to the least deserving of their servants!

Mr. F. W. Haitfer, the Swedish gentleman before quoted, and to whom the world in general, and his own country in particular, is much indebted for a well-methodized set of *Instructions concerning the manner of rearing and improving sheep*, reduces the general causes of their diseases to the five following heads, *viz.* 1. Too great heat; 2. Severe cold; 3. Water; 4. Fright; and 5. Unhealthy pastures. If due care is taken to prevent the inconveniences which arise from these causes, there will not be much room to fear a general sickness or mortality amongst them.

It is generally thought that the brain of a sheep is more affected by heat than that of any other creature: hence the inconveniences which arise to them from the burning heat of the summer; and as their wool forms a warm covering around them, the least additional heat greatly increases that which they have naturally. Even in the winter, sheep, particularly in foreign countries, often suffer from

too-great heat of their cotes, which their shepherds shut up very close, and can scarcely be persuaded that they are doing them an injury. In this very wrong practice, which prevails in the northern parts of Europe, and in France, the heat becomes prejudicial on a double account; first, from the heat itself, which, in crowded cotes, sometimes rises to the dog-day heat; but chiefly by the perspiration of the sheep, which not only makes the air less fit for breathing, but by degrees renders it so putrid as to give rise to fevers of the worst kind.

Though sheep can bear cold much better than heat, yet they should not on any account be exposed to a too severe degree of it; and above all, particular care should be taken that the pregnant ewes do not drop their lambs in the open air when the weather is very frosty, because that might cripple the lamb for life.

Too rainy a season is very prejudicial to sheep, as was remarkably experienced all over England in the summer of 1766, when whole flocks perished with the rot. They who had luckily sown burnet before were then made thoroughly sensible of its good effect, not only in preventing this fatal disease, but also in curing sheep that were then in almost a dying condition. Parsley would have the same effect, as it is probable that both of these plants carry off the too great humidity by urine. Where neither of them can be had, the sheep should be housed during heavy and constant falls of rain, be fed with dry hay, and, as much as possible, sheltered from the wet.

Mr. Hartfer, (a) recommends the following powders, as efficacious preservatives in such seasons. He calls the first of them *ant powders*, and the two

others *drying-powders*. The ant-powder is made thus :

“ In autumn, when the ants have done working, take the whole of an ant-hill, ants and all, scooping it out quite to the bottom, in order to have the more of the mastic or resinous substance which they provide for winter. Dry it well in an oven, till the ants and the earth can easily be crumbled into dust betwixt one’s fingers; then pound and sift it very fine, and keep it in a vessel that has been used for salted meat or pickled herrings; first drying the vessel well before the powder is put into it. Give to each sheep a quarter of a pint of this powder mixed with twice as much oats, in their cribs, or otherwise, after having sprinkled it with pounded salt, very salt water, or human urine. It will make the sheep sweat, and experience will prove its good effect.”

Mr. Hastfer adds, that this ant-powder is much used in Germany, as the writings of Colerus, Bayer, and others testify, that he has seen it given in some places in Sweden, though not many; and that he himself has used it on several different occasions, and found that nature frequently affords in simple remedies as much real utility as in the most costly. In the year 1746, which was a very wet year in Sweden, he give this powder, by way of trial, to four sheep, once a week, and when they were killed the next autumn, their gall and liver were perfectly sound, whilst other sheep, which had not taken it, were full of gall, and their livers covered with hydatides, or watery tumours, in great numbers and of all sizes.

Of his *drying-powders*, as he terms them, one is composed of two ounces of crude antimony, four ounces of bay-berries, four ounces of sulphur, two ounces of nitre, pounded together, and mixed with ten pounds of salt. This is then to be put into the

cribs for the sheep to lick of it, and into their drink, especially in autumn after they are housed, and after a rainy summer, when there is room to fear they may have suffered by the wet.

The other of these powders is made thus: Take a pound of crude antimony, half a pound of nitre, and a quarter of a pound of red tartar; pound them well separately, and mix them together. A good spoonful is enough for six or eight sheep. Mix it with a little meal and dry wormwood, make it into a paste, and give the bigness of a walnut of it once or twice a week to each sheep, in autumn and spring, when a general mortality prevails. This case excepted, it is used only as a preservative once in three weeks or a month; and then not till after the ewes have lambed, and the lambs are somewhat biggish. The sheep must not be suffered to drink the same day that they have taken this remedy; but on the contrary, they should be driven about a little, backwards and forwards. This powder purges them by urine and sweat, drives out their too-abundant humours, and is a very salutary medicine.

The same ingenious writer gives us also, from Van Aken's *Pharmacopœia* for sheep, the following recipe for making the *Pomeranian powder*, famed for its efficacy in curing many disorders in sheep.

“Take a pound of the grey powder of compound salt-petre; of gentian and bay-berries, each four ounces; juniper-berries, common salt, roots of angelica, elder, pimpernelle, aristotolochia, monks-leod, cyclamen, black hellebore, root of fern, bony, millepertuis, carduus benedictus, rhue, millefoil, fumitory, and hyssop, an ounce and a quarter of each, with two ounces of tops of wormwood, two drams and an half of affa-fœtida, six drams of castor prepared. Pound all this into a gross coarse powder, and give to each sheep half an

ounce of it two or three times a week in the morning, mixing it with paste, or making it up into pellets. They are very fond of it. When contagious distempers prevail amongst sheep, and there runs from their mouths a thick and glutinous flaver, it is a good sign; but people who have large flocks, as the shepherds of Pomerania, who have sometimes five or six thousand sheep to take care of, may give this powder to a dozen or more sheep at a time in their water, a little thickened with flour; taking care that each sheep has, as nearly as possible, its portion of half an ounce of it. When this powder is given them, they must not have drank water for two days before.

After they have taken this remedy, they should be driven about a little, and not suffered to drink till the next day, when juniper and wormwood should be put into the water that is given them. If they are dropical, they should not be let drink oftener than every third day. There are extraordinary proofs of the excellent effect of this powder in cases where other celebrated remedies have not done any service; and experience will convince those who use it properly; for it not only expels the noxious humours, and dries gently the scab and small-pox, but likewise eases the breast, so that the sheep that it has been given to twice a week have recovered their health, and in a fortnight after, the dropsy being come on, and their heads swelled again as big as ever, they have been perfectly restored by the use of this powder given two-days together. Care must therefore be taken to use this powder in time, in case of a relapse.

A little salt should be sprinkled over almost all the medicines that are given to sheep: it will make them relish what might otherwise be loathsome; and so far as can conveniently be, they should be

physicked when the weather is fine: however, this must necessarily admit of many exceptions.

Pestilential diseases will be so fully treated of in the latter part of this volume, that I shall only mention here Mr. Hafstfer's having experienced the efficacy of the above *powder of antimony*, in preserving sheep from pestilential infections, even when those which had taken it chanced to be mixed with sheep that were infected. He likewise recommends the use of rhue in their food, and suspended round the neck, when there is a fear of such disorders: and also to prevent their being bitten by snakes, these reptiles having an aversion to that plant.

S E C T. I.

Of Cutaneous Diseases in Sheep.

THE *Scab*, or *Itch*, in sheep, is contagious, and therefore carefully to be guarded against. It arises from various causes, such as unkindly seasons, the skin's being wounded in shearing, or torn by thorns, brambles, &c. Lice also, by breaking the skin in quest of food, or perhaps for nests to lay their young ones in, bring on the itch, as does also the sheep's being reduced by hunger.

As soon therefore as the sheep are observed to scratch or rub themselves against any thing, or to bite their skin, the shepherd should examine their skin with great attention, to see whether they have not the itch. If they have it, the wool must be cut off wherever that disorder is perceived, in order that the part may be the more conveniently rubbed with ointment, in which there is brimstone; for

that seems to be the certain antidote, though many forms are boasted of, in almost all of which sulphur is an ingredient. Quick-silver is sometimes added, on a supposition of its being more efficacious to destroy the lice. The small lice, commonly called ticks, which are little hairy worms shaped like buggs, and which pierce the skin, are easily destroyed by a strong decoction of tobacco-stalks poured all along the back of the sheep, so as to run down on both sides: some add brandy, to render it the more penetrating. Others again put half a pound of tobacco and a handful of salt into five or six quarts of water, boil it well, and after the sheep is shorn rub it in with a brush, not over hard. At the same time they may likewise take the antimony-powder as an alterative, or the æthiops-mineral, if the disorder is come to a great height.

The writers of the *Maison Rustique* recommend strongly the following, as an excellent general remedy for all sores of animals, sheep, goats, dogs, cows, horses, &c. "Take an ounce of liver of antimony, wrap it up in linen, then put it to steep in a quart of wine, (white wine is best) and mix therewith eight drams of senna; you may, if you please, add sugar, nutmeg, and other warm spices; for almost all the diseases of grazing animals proceed from cold and damp. The remedy is not the less good for not having any spice. It has been tried every way. Let the drugs steep twenty-four hours, or boil them with the wine for six or eight minutes, and give a gill of it to each sheep, the same dose to other small animals, and to large ones, such as cows and horses, a quart. The creature must be kept in a warm place all the day, be well covered, and not have any thing to eat till the evening. It will purge both upwards and downwards. The scab and itch will, by this means, be driven out, and the cure will be compleated by bathing the

sores with the wine in which the liver of antimony has been steeped, after setting fire to it. No itch will resist this remedy."

Whatever composition is made use of, it should be rubbed upon the parts affected for at least three or four successive nights; and when the scabs begin to heal and peel off, the sheep should be washed in a river, if in summer, or in a tub of water made a little warm in winter, and be kept within doors till the wool is quite dry. Special care must be taken that the sheep be perfectly cured before they join the flock.

Another cutaneous disorder (*a*), to which sheep are liable, sometimes attacks the face in particular, in such manner that the skin and flesh fall off, the eyes drop out, the ears and horns fall off, and the skull is left bare. Sometimes too it spreads itself over half the body before the sheep dies. This is thought to be incurable, but not contagious. The following application has been attended with the greatest success. Take oil of tobacco and sulphur, with quenched mercury, mix, and rub the sore with them, and wash it once a day with a very strong decoction of rhue boiled in water. A peasant, who had a sheep so ill of this disorder, that its head was eaten all round, freed it from the distemper in five weeks, by treating it as above. Mr. Haßfer (*b*), who relates this case, adds, indeed, the creatures eyes fell out of its head, and that its wool became so intangled and confused as to be all over full of knots.

(*a*) *Haßfer*, part II. p. 179, calls it an *Erysipelas*, or *St. Anthony's fire*.

(*b*) *Part II.* p. 180.

S E C T. II.

Of Diseases of the Head and Throat.

WHEN sheep are exposed to a great heat of the sun, they are frequently seen to become giddy, and turn round. Too much heat of any kind, feeding too long on a dry pasture without drink, or other such causes, may have the same effect. This is remedied by bleeding, either in the jugular, or in the vein under the eye, or by cutting off the tip of the ear, and by keeping them in a cool place, with plenty of cooling drink, till the symptoms quite disappear. But if the complaint arises from water contained in the head, as is sometimes the case, it is incurable; and therefore, when it does not readily yield to easy remedies, the best way is to kill the sheep before the disorder has reduced it.

Sheep are also frequently seized with an apoplexy, in which they fall dead at once. If signs of life remain after they are fallen down, such things as will hereafter be pointed out as antidotes against poison may be given, and blood be drawn from every place that will afford any. Some are very fond of cutting off the end of the tail, and leaving it to bleed as long as it will.

Sheep are liable to tumours in the throat, which should, if possible, be brought to suppurate, lest the matter be translated to some other part. When suppurated, the swelling should be opened, and a free discharge given to the matter: but some caution should be used at first in the opening, to avoid a worm that is sometimes found in such tumours, which being of a poisonous nature, would, if cut,

envenom the sore, and endanger the life of the animal. After the worm has been extracted, the abscess is to be cured as directed for horses.

S E C T. III.

Of Coughs and Shortness of Breath.

THE diseases of the breast, such as cough and difficulty of breathing, are to be treated nearly in the same manner as in similar cases for horses. In case of a fever, which is known by the frequency of breathing, heat, dry mouth and tongue, distrelish of food, &c. blood should be taken from the neck, and repeated occasionally. Frequent bleeding becomes therefore necessary in sheep, because it is seldom that much blood can be got at a time. In other respects, their treatment should be the same as is practised for horses; and the discharge from the nose should be encouraged, as is allowed for horses.

When a cough arises to such a degree as to occasion a discharge from the nose, it is adviseable to separate the sick from the sound, because there is reason to fear that, in this state, the cough may be contagious. Mr. Hafser says (a, that knot-grafts is so very prejudicial to sheep, as to occasion violent coughs, in which they dart forth a thin, stinking matter.

(a) *Part I. p. 105.*

S E C T. IV.

Of Diseases of the Body.

DISEASES of the belly may also be cured in the manner as is practised for horses, only altering the quantities of the doses in proportion to the strength of the sheep. Their having the cholick, or any other disorder in their bowels, may be discovered by their directing their head to the belly, and being otherwise disordered.

S E C T. V.

Of Diseases of the Liver.

THE livers of sheep are subject to several disorders. In the rot, the liver is constantly distempered: hydatides, or small watery tumours, are often found in it, and frequently worms; concerning which last M. de Buffon (a) gives us the following curious extract of a letter written by a doctor of physic at Montiers, in the duchy of Tarantaise in Savoy, communicated to him by M. Rouillé, secretary of state in France for foreign affairs. " It has for a long time been observed, that the sheep of our Alps, which are the best in all Europe, sometimes fall away surprisingly. Their eyes become white, sunk, and bleared; their blood serous, with scarce any redness to be seen

(a) *Histoire Naturelle de la Brebis.*

" in it; their tongue dry and shrivelled; their nose
" stuffed with a yellow viscid and putrid mucus;
" an extreme debility, though they eat a great
" deal; and, in fine, the whole animal system vi-
" sibly decaying. After several close inquiries,
" these animals were found to have in their liver
" white *papillons* (moths), with proper wings, their
" heads of a semi-oval form, and of the bright-
" ness of those belonging to the silk-worm. I
" have been convinced of the reality of this fact, by
" squeezing about seventy, out of the two lobes;
" and, at the same time, all the convex part
" of the liver became lacerated. They have been
" found in the veins only, without a single instance
" of their being in the arteries. In the cystic duct,
" small ones have been found, together with mag-
" gots. The *vena porta*, and the *capsula* of Dou-
" glas, which are visible there as in man, yielded
" to the softest touch. The lungs and other vis-
" cera were found."—Here M. de Buffon very
justly remarks, that it were to be wished the
doctor had given us a more circumstantial de-
scription of these *papillons*, as he calls them, lest
it should be doubted that the animals which he
saw were in truth no other than the common
worms found in the liver of a sheep, which are in-
deed very flat and broad, and of so singular a
figure, that they might rather be taken for leaves
than worms.

The chief reliance for a cure of this disease should,
I think, be in antimony and mercurials; perhaps
of choice in the æthiops mineral. Mr. Haffer re-
commends here rhue mixed with antimony.

Christopher Baldwin, Esq. of Clapton, in Sur-
ry, has found burnet to be remarkably efficacious
in the cure of the rot, as appears from a letter of
his published in a well-intended and very useful
work, called *The Repository for Select Papers on Agri-
culture, Arts, and Manufactures*, begun in 1768,

but unfortunately dropt at the end of only a second volume; and a farmer in the North, in the autumn of the year 1766, when all his sheep were so far gone in the rot that he did expect one of them to live the winter over, sent them into a field of burnet, which, in a month's time, restored them to perfect health.

The Memoirs of the Royal Society of Agriculture at Rouen informs us (*b*), that one of their members had recommended parsley as a good remedy for several of the diseases to which sheep are subject, such as pimples, the small-pox, running at the nose, the itch, &c. and that it had been found to answer, when tried by a dealer in sheep, whom they name. The way of using it is, to turn the diseased sheep fasting into a field of parsley, and leave them there for a quarter of an hour a day during eight days. The parsley will grow again, so as to yield feed, or may be cut and dried for sheep that are ill in the winter.

When sheep have swallowed any live creature, such as spiders, caterpillars, leeches, &c. the best way of treating them is the same as used for horses in a similar case.

S E C T. VI.

Of the Dropsey.

SHEEP are subject to a watery swelling, which frequently affects the whole body; and is at first discovered by the head's becoming larger, particularly under the lower-jaw, where the water is

collected into a kind of bag, and by the body's being swelled.

The cure should begin with antimonial purges, keeping the sheep at the same time on dry food.—A full pint of strong decoction of the lesser species of sedum (*sedum minus*) given to a sheep as soon as this disease is perceived, is said to be an excellent remedy in cases of this kind. It purges strongly.

Likewise the following is recommended by Mr. Haltfer (*a*), as very efficacious for sheep that have the dropsy.—After purging them, which should always be the first thing done in this disease, take of dried wormwood, either powdered or cropt small, of parsley picked clean and shred small, of bark of elder pounded or ground, a quart each; also a gallon of strong sea-salt well pounded, and a full quart of oat-meal, or as much as may be wanted to make the whole into a paste. Put all these ingredients into a kneading-trough, mix them well together, and knead them into a paste with good river water. Make this paste into pellets about the bigness of a walnut, and give to each sheep fasting two or three of them, according to its size and age. The sheep must remain housed for three or four hours after they have taken this remedy, and then they may be walked out, if the weather is fair and dry, but with great care to keep them from water all that day. If the weather be bad, the best way is to feed them that day and the following night in their cote, with straw, or other dry food.

The way to make them take this remedy, at least till they become accustomed to it, is, to thrust the pellets down their throat with one's

fingers: but they will soon eat them of their own accord, if they are only laid in the crib.

These balls are used every year in the sheepcotes of Hojentorp and Berga, in Sweden, and have been found to be a certain cure for the dropsy in sheep. The above-mentioned quantity of ingredients will make from 170 to 180 balls, which are sufficient for sixty old sheep, or eighty or ninety young ones, or lambs.

In case the necessary ingredients cannot be had in the country, take for ten or twelve sheep the value of five or six quarts of oatmeal, and dry it well in an oven, or over the fire, in a pot or pan, then mix with it salt and bay-berries dried and pounded, of each a good pint, half a pint of powdered wormwood, an ounce of laurel-berries pounded, and a pint of nettles with their seed dried and pounded. All this being well mixed together, it may be given to the sheep in a trough or crib made on purpose for that end, or it may be divided into portions of a pint for each sheep, and given in the morning fasting, with care not to let them eat any thing else till two or three hours after, at the end of which they may have hay or dry straw; but they should not be suffered to drink that day. This should be continued twice a week so long as is necessary, and in proportion as the distemper is more or less obstinate. One may likewise from time to time, offer them wormwood-water to drink.

If the sheep refuse to take the medicine thus prepared, let some oats be ground, and a paste made of their meal, with the other ingredients, to which may be added for each sheep three or four drops of oil of sot, and of bark of the birch-tree. Let the same number of balls be made of it as was before said, and given to the sheep in the same manner.

Another remedy is made thus: Take four pounds of rhue, shred it fine, put it into a tub, pour upon it six or eight gallons of boiling water, cover the tub, and let it remain to infuse six hours: then strain the water off through linen, and put in as much sugar as will make an egg swim upon it.

When sheep are dropical, two spoonfuls of this are given them evening and morning, till they are cured: but as a preservative, only one spoonful is given them, evening and morning, twice a week. Five spoonfuls of it are given, evening and morning, to large cattle, in the same manner as it is given to the small. Also, a mole may be taken, cleaned, and dried, then pounded, and when a sheep or other animal is seized with the hydrophobia, let the bigness of a pea, or of a small bean, be given to it in a spoonful of beer. This remedy has been repeatedly tried, and found successful (b).

(b) *Häffer, part II p. 218.*

BOOK V.

Of G O A T S.

THE Goat is naturally more sagacious and better able to shift for itself than the sheep: it comes readily to man, soon grows familiar, is sensible to caresses, and capable of attachment; it is also stronger, and less timorous than the sheep. It is quick in its motions, capricious, more lively, nimble, obstinate, and so fond of roving, that the strongest and most active man cannot drive above fifty goats at a time; consequently it is difficult to keep them in herds. They are fond of straying in solitary places, of climbing up craggy mountains, of standing and even sleeping on the summits of rocks and the brink of precipices. The most scorching rays of the sun never incommoded them; they are not frightened by storms, and they bear rain quietly, but they seem to be affected by great cold. There is scarcely a spot so barren as not to afford them sufficient sustenance, for they will browse even upon thorny shrubs; and very few sorts of herbs disagree with them, even hemlock not excepted, which is poison to other animals.

Goats are naturally so fond of man, that they never become wild near inhabited places. As a proof of this; in the year 1698, an English ship having put in at the island of Bona Vista, two negroes came on board, and after some intercourse told the English that they should be welcome to as many he-goats as they pleased. The captain ex-

pressing some surprise at this offer, the negroes answered, that there were only twelve persons on the whole island, and that the goats had increased so prodigiously as to be even troublesome; and that they were so far from being difficult to catch, that they would follow a man like tame animals.

The most usual colours of goats are white and black; some are entirely white, and others wholly black; but generally white and black, and often with a mixture of brown and fallow. The hair is of an unequal length on different parts of the body; every where stronger than that of horses, but less harsh than that of the horse's mane; and there have been instances of its being intermixed with tufts of a whitish wool, as long as the hair, on the back and upper parts of the sides. The beard of a he-goat, which M. de Buffon measured, was nine inches long, and its mane, towards the withers, was six inches in length. On the rest of the body, the hair was in general about three inches long, but somewhat more on the pasterns and coronet.

The male-goat is capable of engendering at a year old, and the female at seven months; but the kids of this forward commerce are weak and defective; for which reason they are generally both restrained from copulation till eighteen months, or two years. The he-goat, besides being no despicable animal, is so very vigorous and fallacious, that one will be sufficient for above an hundred and fifty she-goats, during two or three months; but this ardour consumes him, and never lasts above three or four years; so that he becomes enervated, and even old, before he has reached his sixth or seventh year.

Such is the disposition of the she-goat, that the sickleness of her temper is plainly seen from the irregularity of her actions. She walks, stops, runs, skips, leaps, draws near, flies off, appears in sight,

hides herself, or flies away, as by caprice, and without any other determining cause than the unaccountable vivacity of her internal sentiments; and all the suppleness of her limbs, and vigour of her body, can hardly answer the wantonness and rapidity of these motions, which are purely natural.

For propagation, the he-goat should be young, and of a good figure; that is, about two years old, and of a large size; his neck short and fleshy, his head slender, his ears long and lapping, his thighs large, his legs firm, his hair black, thick, and soft, and his beard long and bushy. The she-goat should have a large body, full rump, large thighs, light head, capacious udder, long teats, and soft and thick hair. Their usual season of heat is during the months of September, October and November; but at any other time, if they happen to be near the male, they are soon disposed to admit him; for they can copulate and yean at any time of the year. They however, retain best in autumn; and the months of October and November are preferred, in order that the young kids may find a soft, succulent herbage, when they first begin to feed: for the she-goat goes five months, yeans at the beginning of the sixth, and suckles her kids about a month or five weeks. Generally, indeed, she brings only one kid; though sometimes she has two, very seldom three, but never above four. These creatures sometimes suffer greatly in yeaning, and therefore they should be watched, in order to be assisted in case of need.

Goats are turned out to feed very early in the morning, before the dew is off the grass; because this, though pernicious to sheep that are not fattening, is extremely palatable, and even wholesome, to these animals. In snowy and wet weather, they are kept under cover, and fed with

herbage, small boughs of trees gathered in autumn, cabbages, turnips, and the like. Plentiful feeding increases their milk; and to keep up, or still augment its quantity, they should be made frequently to drink water mixed with nitre and salt. They may be milked in a fortnight after yeaning, and during four or five months they yield plenty of milk morning and evening.

When goats are driven with sheep, as sometimes happens, they always take the lead of the flock: but it is better to feed them separately on high grounds, hills, mountains, and such like places, in which they take most delight. Heaths, fallows, commons, and barren grounds will afford them as much food as they want: but they must never be suffered to feed in cultivated lands, corn-fields, vine-yards, or woods, because they would browse greedily on the young shoots, or the bark of the trees, and thereby do great damage.

The he-goat readily copulates with the ewe, as the ass does with the mare; and the ram joins himself with the she-goat, as the stallion does with the she-ass. But, though these copulations are sufficiently frequent, and sometimes prolific, no intermediate species has been formed between the goat and the sheep: they are absolutely distinct, continue always separated, and always at the same distance, without having been the least altered by such mixtures.

Goats cannot endure damp places, marshes, or rich pastures: few of them are bred in flat and open countries, because they generally are sickly there, and their flesh is of a bad quality: but in most hot climates they are bred in great abundance, without any shelter over them; whereas in colder regions, the winters would kill them if they were not housed. In summer they do well without litter, but in winter they require it; and as all wet is very hurtful to

them, they should not be suffered to lie in their dung, but have fresh litter as often as needful.

The she-goat is prolific to the age of seven years, and the he-goat might certainly retain his generative faculty to that, or even a greater age, if he was suffered to be with the females only at proper times: but he seldom serves longer than five years, which bring him to about the same age: he is then castrated, and sent to fatten with old she-goats, and young he-goats castrated at six months, for that is the usual time, in order to render their flesh more tender and juicy. They are fattened in the same manner as sheep: but neither care nor aliment, of any kind whatever, can possibly render their flesh equal to that of the sheep, unless, perhaps, it be in hot climates, where mutton is always flabby and ill-tasted. However, the strong smell of the he-goat does not proceed from his flesh, but from his skin; and the older he is, the ranker that will be.

M. de Buffon says (a) that these animals might live to the age of ten or twelve years, if they were not killed, when fattened, after being past engendering; and I cannot but be of the opinion of that very judicious and experienced naturalist; consequently, the Chaplain to the Centurian's telling us in his account of Lord Anson's voyage, that they found upon the island of Juan Fernandez a he-goat, which, from the slits in his ears, appeared to have been formerly under the power of one Selkirk, who lived several years on that island, and had quitted it above two and thirty years before their arrival, appears to me, supposing it to be literally true, nothing more than one of those exceptions to a general rule, which M. de Buffon himself apprizes us will sometimes happen.

(a) *Histoire Naturelle de la Chèvre.*

The age of a goat may be known by its teeth, and by the knots in its horns, when it has any; for though both he and she-goats generally have horns, there are many exceptions to the contrary; and as to their teeth, they have not any of the incisory ones in their upper jaw, but those of the under jaw are shed and recruited at the same times, and in the same order, as those of sheep. In the she-goats, indeed the number of teeth is not always the same, but usually less than in he-goats, whose hair is also harsher, and their beards and horns longer. Like the ox and sheep, they have four stomachs, and chew the cud. They also differ greatly in the colour of their coats. Those that are white and without horns are said to yield the most milk, but the black are the strongest and most robust.

These creatures cost little or nothing to bring up, as we have seen, and their value is by no means inconsiderable, if properly attended to; for their flesh will always fetch something, and their suet, hair, and skin, sell at a good price, especially the skins of kids, of which the finest gloves are made. The skin of the goat is preferred to that of the sheep, and the flesh of the kid is nearly equal to that of the lamb. They are less affected with the diseases of any climate than sheep are, and stand less in need of the assistance of man. Goat's milk is a part of the *materia medica*, frequently prescribed in cases of decay, and wholesomer than that of the ewe: it curdles easily and makes excellent cheese; but as it contains only a small proportion of butyrous particles, the cream should not be separated from it.

She-goats seem pleased with being fucked, as they often are by children, to whom their milk is an excellent aliment. Like cows and ewes, they are apt to be fucked by snakes, hedge-hogs, and

a bird called the goat-sucker. They yield a greater quantity of milk than the ewe.

The species of goats extends much farther than that of the sheep ; several parts of the world affording goats like the British, with this exception only, that in very hot countries they are smaller, and in cold ones larger.

The Angola, or Syria goats, with their long, pendulous ears, and spiral horns, are of the same species with British, engendering and producing even in European climates. The the-goats in particular, of this breed, like most other animals of Syria, have a very long, thick, wiry hair, so fine, that the stuffs made of it are not inferior to silks, and full as glossy ; witness in particular the beautiful Brussels' camblets.

BOOK VI.

Of SWINE.

CHAP. I.

Of the Character, Properties, and Uses of Swine.

OF all the quadrupeds that we know, or at least, certainly of all those that come under the husbandman's care, the Hog appears to be the foulest, the most brutish, and the most apt to commit waste wherever it goes. The defects of its figure seem to influence its dispositions: all its ways are gross, all its inclinations are filthy, and all its sensations concentrate in a furious lust, and so eager a gluttony, that it devours indiscriminately whatever comes in its way, not excepting, frequently, its own young immediately after they are born, and too often infants in the cradle; for, whenever these creatures meet with any thing fat, moist, or unctuous, they begin with licking, and soon after devour it. They are consequently fond of blood, and bloody flesh, which they will sometimes even when putrid, to the great detriment of their health, though they do not, like the wolf, attack other animals on purpose to kill and devour them. So unbounded is their ravenous desire to fill the vast capacity of their stomachs, and so undistinguishing is their taste, that M. de

Buffon (*a*) declares he has several times seen a whole herd of these creatures, at their return from the fields, stop and gather round a heap of clay newly dug up, all of them licking this earth, though none of the most unctuous, and some of them swallowing a pretty large quantity of it. This demonstrates their gluttony to be of a piece with their brutal nature: nor is their sense of feeling less sluggish than their taste; for, not only the harshness of their hair, the hardness of their skin, and the thickness of their fat, render them little sensible of blows, but even mice have been known to form lodgments in their backs, and to eat their very skin and fat, without their showing any signs of feeling them. Their other senses are indeed quick and acute enough: though still they seem not to have any one clear sentiment; for the young hardly know their own dam, or at least are very apt to mistake, and readily suck the first sow that will let them. Fear and necessity probably impart a little more instinct and sentiment to the wild race of hogs; for the young of these are strongly attached to their mother, and she, on her side, shows herself more careful to provide for their wants, than the tame sow does: and as to the very great quickness of sight, hearing and smell in hogs, especially of the wild breed, it is so well known to the huntsmen who go in quest of these creatures, and particularly of wild boars, that they find it necessary to watch for them in the night, to observe a profound silence, and to keep themselves to the leeward, that the hogs may not scent the effluvia of their bodies, which affect the organs of smelling in these animals so strongly at a considerable distance, that they immediately betake

(a) *Histoire Naturelle du Cochon.*

themselves to flight, as if aware of some impending danger*.

The natural defect in the senses of taste and feeling in swine, is also farther increased by a disease which renders them even absolutely insensible, and which is not perhaps so much owing to the texture of their skin, as to their filthiness, particularly in feeding, and especially to their often eating putrid aliments: for neither the wild hog, which does not eat such ordure, nor delight in mire as the tame one does, but generally subsists on acorns, mast, and roots, and lives in dry places, nor a sucking pig, is subject to this disease; whence it follows, that the way to preserve the common hog from it is, to keep him in a clean sty, and to give him plenty of wholesome food.

With all its defects, however, this animal is one of the most profitable that an inhabitant of the country can rear; for, besides its young, which generally are very numerous, and always fetch a good price, its flesh sells for rather more than that

* The reader who is not acquainted with the method of hunting the wild boar, may not be displeased at the following addition, from M. de Buffon's Natural History of the Hog. "The wild boar is, " most commonly, either hunted openly with dogs, or surprised and " killed by moon light. As he is not remarkably swift of foot, he " leaves a very strong scent, and often wounds the dogs dangerously " in defending himself. For this reason, and because it spoils their " scent, and breaks them to a slow pace, the good hounds used for " the stag and roe-buck, (or for the fox,) should not be employed in " this hunting. Mastiffs, after a little training, will be fit for this " purpose: but only the oldest of these animals are to be thus attacked, " and they are easily known by their tracks. A wild boar of three " years is not easily run down; he paces over a great deal of ground " before he stops: whereas an old boar does not run far, but suffers " the dogs to come near him, and often stops to keep them at a bay. " In the day-time he generally keeps in his boar, which is almost " always situated in the thickest part of the wood, and when night " approaches he goes out in quest of food. In summer, when the " grain is ripe, it is easy to surprise him among the corn and oats, " which he is sure to visit every night. As soon as he is killed, the " huntmen cut out his testicles; the smell of which is so strong, that " if they were left only five or six hours in the dead body, all the flesh " would be infected by it."

of the ox or sheep, and its lard for near twice as much as their suet†. Likewise the flesh of this animal takes salt better than that of any other, and keeps longer in this state. Its blood, all parts of its bowels, its feet, and its tongue, are dressed and eaten. The fat of the intestines and cawl, which is very different from the lard, makes what is called the hog's grease: nor is the skin without its uses, both saddles and sieves being made of it; and of the bristles are made various kinds of brushes, shoemakers' ends, &c. and lapidaries use them in polishing of diamonds. The dung of this animal is accounted a fine manure for fruit-trees.

C H A P. II.

Of Feeding and Fattening of Hogs.

THESE creatures are so very stubborn and untractable, that even an active man cannot well take care of more than fifty of them at a time. In autumn and winter, where it can be done, they are driven to such woods as afford plenty of wild fruits: in summer, they feed best in moist and marshy places, where they find worms and roots; and in spring they range the fallow fields. From the month of March to October, they are turned out twice a day to feed; in the morning from the time that the dew is exhaled till ten o'clock, and from two in the afternoon till the dew begins to return in the evening. In winter they are driven abroad but once a day, and then only when the weather is fine; because the dew, snow, and rain

† The lard of the hog is the same as the suet of other animals.

rain are hurtful to them. Indeed, such is their aversion to bad weather, that if a sudden storm comes on, or only a heavy shower of rain, away they run, full speed, each endeavouring to be foremost, and all continually crying out, till they reach their sty, or some other place of shelter. The youngest cry most and loudest. This cry is very different from their usual grunting: it is a cry of grief, resembling that which they send forth when they are bound in order to be killed. The boar cries less than the sow; and the wild boar is seldom heard to cry at all, unless when wounded in fighting with another. The wild sow cries more frequently; and both, when surprised and terrified, snort with such vehemence as to be heard at a considerable distance.

These animals are very fond of worms, and particularly so of some roots, especially those of the wild carrot; and to come at these they turn up the earth with their snouts. The wild boar, whose head is longer and stronger than that of the common hog, delves deeper, and generally continues the furrow in a strait line; whereas the tame hog digs only here and there, and at the same time more slightly: but as a great deal of damage is frequently done by this means, all hogs should be carefully kept from cultivated lands, and suffered only to run in woods and fallows.

The common way of fattening hogs is, to give them plenty of barley, mast, cabbage, and other greens boiled, and a great deal of water mixed with bran. By this means they acquire a thick stratum of seam, and are rendered sufficiently fat, in two months: but this fat is neither very firm nor very white; and the flesh, though good, is flabby. They may also be fattened at still less expence in countries which abound in mast, by driving them into the forests in autumn, when the

acorns, wild chesnuts, and beech-masts are ripe. They there eat all kinds of wild fruits, and grow fat in a short time; especially if, at their return in the evening, plenty of luke-warm water be given them mixed with a little bran and the meal of tares; for this makes them sleep, and increases their flesh to such a degree that they are sometimes scarce able to move; but the fat thus acquired is disagreeably oily. They likewise fatten soonest in autumn, when the weather begins to grow cold, because they then perspire much less than in summer, and have greater plenty of food. But the best way of all to fatten them for their flesh to acquire a fine flavour, and their fat to be firm and palatable, is, to shut them up for a fortnight or three weeks before they are to be killed, in a clean paved sty, without litter, and to feed them only with pure dry wheat, allowing them at the same time but very little drink. The hog thus treated should be about a year old, full of flesh, and previously half fattened; for the older the hog is, the longer time it requires to fatten, and its flesh is also proportionably worse.

Castration, which must always precede the fattening of any animal, is usually performed on hogs at the age of six months, and either in spring or autumn; but never in very hot or very cold weather, because each of these is equally dangerous to the wound, and renders its healing difficult; this operation, which every tinker knows how to do, is most commonly performed by incision, though sometimes by a ligature only, as in the ram. Those which have been castrated in the spring are generally fattened the next autumn, and commonly killed before they are two years old; though they grow very considerably in the second year, and would continue so to do for several years longer; those which are particularly remarkable for their

height and corpulence, being only creatures of a greater age, which have been turned out several years to feed on mast. Their time of growth does not seem confined to four or even five years; for the boars which are kept for propagation continue to grow in their sixth year; and the older a wild boar is, the larger and heavier he becomes. It is true, that the head of an old wild boar is the only part worth eating; whereas all the flesh of the wild boar and sow not a year old, is delicate, and of a fine grain; but the flesh of the tame boar is still worse than that of the old wild boar, and can be rendered eatable only by castration and fattening, unless it be when made into brawn.

The antients used to castrate such wild pigs as they could at any time find means to steal away from their mother, and afterwards carried them back into the woods: the castrated wild hogs not only exceeding the tame in bigness, but their flesh being also better.

C H A P. III.

Of the Propagation of Swine.

BOTH the male and female of this species of animals are able to copulate when only nine months or a year old: but it is better to let them double that age before they are put together; for the first litter of a sow, when she is not a year old, consists of only a few, and those weak and even defective pigs. She may be said to be in heat at all times; and even when she is pregnant she seeks the boar, which, among animals, may be deemed

an excess; the female in almost every species refusing the male after she has conceived. The heat of the sow, which is almost continual, declares itself more particularly at intervals, by her emitting no small quantity of a thick, whitish liquid, and by uncommonly violent motions which always end with her weltering in the mire. She goes four months, and farrows at the beginning of the fifth; soon after which she again grows eager for the male, becomes pregnant a second time, and thus farrows twice a year. The wild sow, which resembles the tame one in all other respects, farrows but once a year; probably because of the scarcity of food, and the necessity she is under of suckling and feeding all her litter for a considerable time: whereas the tame sow is never suffered to suckle all her pigs above a fortnight or three weeks; after which eight or nine only are left with her, and the rest are carried to market. They are fit for eating in a fortnight; and as few sows are wanted, the castrated pigs being more profitable to rear, and their flesh the best to eat, most of the sow pigs are disposed of, only two of these, and seven or eight boar pigs, being generally left with the sow. She should never be permitted to suckle any of her pigs above two months; and even at the end of three weeks it is best to drive them to the field with her, that they may by degrees accustom themselves to feed as the does. In about five weeks after this, they are weaned, and whey mixed with bran, or at least warm water boiled with greens, is then given them morning and evening.

The boar for propagating should be short and thick of body, rather square than long, with a large head, a flat short snout, large flagging ears, small fiery eyes, a large thick neck, a swagging belly, broad buttocks, short thick legs, and thick and black bristles, white hogs being never so strong

as black. In the sow, the body should be long, the belly broad and capacious, and the teats long. She should also be of a quiet disposition, and taken from a fruitful breed. When pregnant, she must be kept apart from the boar, or he would probably do her some mischief; and when she has farrowed, she must be fed plentifully, and also watched, lest she should devour some of her pigs: the boar especially must be removed, for he would show them still less mercy. The sow is commonly put to the boar in the beginning of spring, in order that, by farrowing in summer, her pigs may have time to grow and gather strength and flesh before winter: but when it is intended that she should farrow twice a year, she is had to the boar in November, that she may farrow in March, and be again put to him in May. Some sows farrow regularly every five months. The wild sow, which, as was before observed, farrows but once a year, admits the boar in the months of January or February, and farrows in May or June. She suckles her young three or four months, leads them abroad, follows them, and keeps them from straying, till they are three or four years old; so that it is not uncommon to see wild sows with their young of the present and preceding year about them.

Wild boars are called *founders* during their first year, and *beasts of company* till they are three years old, because they keep together till that age, and never go alone till they are strong enough to encounter the wolf: by this means these animals compose among themselves a kind of squadron, and in this their safety consists; for when they are attacked, the largest form themselves into a close circle round the lesser, to keep off the enemy. The same method of defence is also practised by tame hogs; so that there is no occasion to make use of dogs to secure them from beasts of prey.

It is not uncommon for boars to live twenty-five or thirty years. Aristotle says, that hogs in general live twenty-years; and adds, that the boars engender, and the sows bring forth, till the age of fifteen.

I cannot conclude this last chapter of my work, without continuing to observe with M. de Buffon, that this species of animals, though known, and even found in great plenty all over Europe, Asia, and Africa had never been seen in America till it was carried thither by the Spaniards, who turned great numbers of black pigs loose on the continent, and also on its larger islands, where they have increased prodigiously, and in several places become wild. They resemble the European wild boars; but their body is shorter, their head larger, and their skin thicker than in other hogs, which in hot climates are totally black, like the wild boar.

A ridiculous prejudice, which owes its continuance to superstition, deprives the Mahometans of this animal: they are taught to look upon it as unclean, and so far from eating, that they dare not even touch it. The Chinese, on the contrary, are very fond of hog's flesh: it is their most common food, and is said to have animated them to refuse the doctrine of Mahomet. The Chinese hogs, which are the same with those of Siam and India, differ from those of Europe, in that they are smaller, their legs considerably shorter, and their flesh much whiter and more tender. Some persons breed them here, and they copulate and engender with our common swine. The negroes also breed vast numbers of hogs; and though they are very scarce among the Moors, and in all Mahometan countries, wild boars abound as much in Asia and Africa as in Europe.

C H A P. IV.

Of the Diseases of Swine.

THE only disease that I know of which seems to be peculiar to swine, is a kind of leprosy, commonly called *measles*. When it seizes them, they become dull and sleepy. If the tongue is pulled out, the palate and throat, will be found full of blackish spots, which appear also on the head, neck, and the whole body; the creature is scarce able to stand on its legs, and the roots of its bristles are bloody.

As this disorder proceeds chiefly from their gluttony and filth, the only way of preventing it is, as was said before, to keep them clean; and the most probable way to remedy it is, to put the diseased hogs into a separate clean sty, and there give them wholesome food; to wash them carefully, and let them have plenty of water to wallow in: antimony, and its preparations, will also be of service to them.

BOOK VII.

Of the CONTAGIOUS DISEASES of CATTLE.*

THE contagious diseases which have attacked cattle at different times are not all of the same nature. The authors who have noticed them, have given different descriptions of them. I shall first describe those of which they have spoken, and then proceed to those which have appeared in our days. It must be from a knowledge of what was observed in former epidemics, that we can learn to guard against the dire effects of future ones; for it is but too certain, that those which have already appeared will appear again, as there will hereafter be occasion to remark; and the proper treatment of diseases which may hereafter attack cattle, can be learnt only by considering what was done for them before: for, as in the cure of diseases incident to men, so in those of animals, experience is all in all. Experience makes us acquainted with each species of malady, its genus, the different causes which have contributed to its production, the remedies which have been applied, and their effects. "Be always mindful," says Hippocrates (*a*), "of whatever has cured diseases, of

* Abridged from *Mémoire sur les Maladies épidémique des Bestiaux, par M. Barberet, M.D.* to which the Royal Society of Agriculture at Paris adjudged their premium for the year 1765, and of which they were pleased to transmit a copy to the writer of this work.

(a) *Lib. de decent. Ornac. § 8.*

“ the appearances under which those diseases have
“ shown themselves, of the changes they have un-
“ dergone, and of the different manners in which
“ they have affected different creatures; for this
“ is, in physic, the beginning, the middle, and the
“ end.”

The antients afford us but little instruction concerning the contagious diseases of cattle, a scourge which so often sweeps away whole herds; for they scarcely enter into any description of them. Virgil, at the end of his third Georgic, describes, indeed, a mortality amongst cattle; but what he says is rather the flight of a poet's imagination, painting the ravages of any epidemic disorder, than the description of a particular one: and though we find in Celsus prescriptions for many maladies of horses, oxen, and sheep; yet he has not given us a description of any epidemic disorder: nor is Columella at all accurate in his description of the contagious diseases of cattle.

We must therefore come so far down as Ramazzini, who, in his account of the epidemical constitution of the year 1690, at Modena, says, that the season was cold and moist, and that the reigning distempers of that year attacked all the people who lived in the country, and spread itself indiscriminately amongst all kinds of animals, of which great numbers died after a few days illness. Nature made strong efforts to disengage herself from the disease by a critical discharge on the thighs, neck, and head, resembling the pustules of the small-pox. Most of the animals which had this appearance lost their eye-sight. Those creatures which were not carried off by this disease, but resisted its violence, lost their flesh by degrees, and fell into a marasmus. Ramazzini did not scruple to declare these pustules to be the small-pox; for they differed not from it in form, in colour, or in

the matter which they contained, nor in size, nor in the manner in which they went off: when they had dried off after the suppuration, they left a black scar, like to that which remains after the small-pox.

This epidemic contagion continued in 1691, and attacked chiefly the sheep, so violently that the breed was almost destroyed: (*Ita ut ovinus grec pene deletus fuerit.* Ramaz. p. 42.) It has been constantly observed, that, of all the animals, sheep are the most subject to the small-pox. The French call it, in them, *clavin*, or *claveaux*, and I shall speak more fully of it hereafter. It was therefore to be expected that they should be particularly affected by it, since they are more disposed to it than other cattle.

In 1693, Hesse saw her herds carried off by a pulmonary phthisis. (Const. epid. Hassiac. ann. 1691.) The winter of that year began with rain, and ended with very severe cold: an extraordinary warmth which commenced in the spring, and continued during the whole summer, took place all at once of the former cold. Such sudden changes always occasion unusual motion in the fluids, and frequently obstructions in the capillary vessels; and hence it seldom happens but that a sudden change from cold to heat brings on epidemical diseases: yet the disorder which then reigned in Hesse was also attributed to a blight, or corrosive dew, which fell on the pastures in 1693, in the same manner as the pastures in Italy had been infected in 1690. Besides these causes, the above-quoted observer imputes the disorders to the coldness of the water, which, the animals drinking greedily of it whilst they were very hot, contributed much to the pulmonary phthisis: for if a man in a great sweat drinks a draught of ice-water, it is to be feared that he will be seized with a pleurisy

or peripneumony. The case is the same with animals.

The spring of the year we are speaking of being very warm, the bullocks and cows, heated both by the warmth of the season, and by the devouring fire which raged in their bowels, through the infected quality of the plants they had fed on, ran to the coldest water they could find. One of the first effects of cold is to condense fluids, and to lessen the diameters of vessels. The fibres of the capillary vessels, being contracted by the action of the cold, stopped and returned the blood which before flowed freely in those vessels, and from thence proceeded an inflammation. When this happens to a considerable number of vessels, they burst, and their coats, with their contents, turn to pus, or that matter which we see in boils. This is what happened in Hesse: the inflammation, at first neglected, suppurated, and the cattle sunk under a pulmonary phthisis.

In the year 1712, they were attacked in Lower Hungary with a most dangerous distemper, (*Const. epid. inter Hunger. ann. 1712.*) The winter had been extremely cold, and the spring rainy, with great changes in the temperature of the atmosphere; for on the same day the morning was cold, the middle of the day very warm, the cold began again about three o'clock, and the evening became warm. These changes occasioned amongst men many fevers, which were as irregular as the season. In the months of June and July, during which the weather continued constantly warm, there appeared a prodigious number of insects, reptiles, and particularly serpents which killed many persons in the country. Their bite brought on a swelling which spread very fast all over the body, and particularly to the tongue, so that the sick could not utter a word. The cattle were not less subject to the bite

of these serpents, than the men; and accordingly the mortality among them was very great.

In August, which was very rainy, the mortality increased, but by a new kind of disorder, which showed itself by white pustules filled with matter insufferably stinking. A liquor of a cadaverous smell flowed from the mouths of the sick cattle; it was with the utmost difficulty that they breathed: the bullocks and cows seized with this disorder bellowed constantly, and without intermission, as death approached. A noise was then heard in their bowels, as if the coats of their intestines, distended too much, burst. Though the observer does not mention it, yet every circumstance, especially the pustules, declare this distemper to have been the small-pox complicated with some other disorder. The liquor which flowed from the mouth greatly resembled the spitting which comes on in men in the small-pox. The difficulty of breathing, the stench of the breath, and the infectious smell of the pustules, are symptoms which constantly attend the *clavin* or small-pox in sheep, when the disease is violent or accompanied with putrefaction.

In the stomach of the animals which were opened were found balls of the size of a wallnut, filled with hair, and covered with a membranous tunic, so hard that it could scarcely be cut with a knife. This membranous tunic is uncommon; for the egagropiles are not organized bodies.

This mortality spread even to the wild beasts, several of which were found dead in the forests. The dogs which ate of their flesh, or that of any of the animals that died of the contagion, became mad; and the men who were bitten by them were seized with the hydrophobia.

The changeableness of the season had a great share in the epidemic here spoken of, and the mul-

titude of reptiles contributed to render it still more dangerous to cattle: for the great number of insects which adhered to the grass they fed upon, might cause as many disorders as the blight before mentioned; because all animal substances are of a more septic quality than grass, which is the natural food of cattle.

The epidemic disease of 1711 (b), which made such havock in Italy and Germany, came originally from Hungary, by means of bullocks brought from that country: for there appeared nothing in the constitution of the air, nor in the food, that could give rise to it; nor did it affect cattle which had no communication with those that came from Hungary. The infection seemed to be communicated by their saliva dropped on the grass; so that sound cattle, which afterwards fed on the same pasture, contracted this disorder with which the others were infected.

The virus, which was communicated by the saliva, was so extremely acrid, that it acted as a caustic on the gullet, stomach, and intestines, affected the nervous system, occasioned spasms, contracted the fibres, and caused obstructions in the capillary vessels: the fluids consequently became putrid, and the bowels were seized with gangrenous inflammations. The disease was attended with a burning heat, a total loss of appetite, a difficulty of breathing: in some bullocks the tongue was inflamed and covered with many red blisters; the stomach, the epiploon, and especially the intestines, were also inflamed; the parts near the liver were of the colour of the bile; the excrements were purulent, tinged with blood, and of an insufferable stench, so that, says the observer who has left us this account, the disorder assumed the appearance

of a malignant dysentery: and yet the dysentery here certainly was only symptomatic.

The mortality amongst the cattle ceased but very little during the winter, and began again the next year: the cause, however, did not seem to be the same; for the epidemic disorder in 1712 appeared with different symptoms. It first attacked the horses, especially those which were in the neighbourhood of Augsбург; yet almost all that were in the town escaped. It afterwards spread to the bullocks and cows, and to many other animals of different kinds. On the breast, groin, and many other parts, there arose hard tumours, which extended greatly, and soon carried off the cattle affected with them. This disorder seems to have been the consequence of that of the former year; the hard tumours and the symptoms attending them being imputed to the sting of hornets, of which there was an incredible number in 1712, of an uncommonly large size. It was said that they fed on the bodies of the cattle which died the year before, and had not been buried sufficiently deep. That the sting of these hornets bred in and fed on infection, could not but be dangerous, will appear from the following event, which shows to how great a degree the juices were altered.

A man intending to chop off the foot of a horse which had died of the sting of a hornet, and had not been buried deep enough, the foot appearing above ground, some drops of the juices splashed about by the hatchet he made use of flew into one of his eyes, and caused there an inflammation and swelling, which soon extended to the other eye, afterwards over the whole head, and finally killed him.

Lancisi informs us, that the wise precautions of Pope Clement XI. preserved for two years the states subject to him, from the contagious disease

which a bullock had brought from Hungary into the district of Padua, from whence it spread all over the Venetian territories and the Milanese, and at length penetrated into the kingdom of Naples. In the middle of the summer of 1713, information was received, that some drovers were conducting a great number of cattle to the fair of Frusino, a town in the ecclesiastical state, but bordering on the kingdom of Naples. To prevent all danger, orders were immediately given, that the fair should not be held. The drovers seeing the impossibility of selling their cattle as they had intended, led them through bye-ways to Rome. They were sold at a low price; and being sold again to the inhabitants of the towns and villages throughout that province, the infection was soon spread over the whole Campania of Rome. An exact register was kept of all the cattle that died from the month of October, 1713, to the month of April, 1714, when the infection ceased in the ecclesiastical state, and presents us a shocking detail of the effects of that pestilence, by which were destroyed 8466 oxen used for ploughing, 10125 white cows, 2816 red cows, 108 breeding bulls, 427 young bulls, 451 heifers, 2362 calves, 862 buffaloes, male and female, 635 young buffaloes, in all 26252 cattle in the space of nine months. Lancisi thinks, that if the computation had been begun from the 2d of August, the number of cattle which perished would have amounted to 30,000.

That author does great justice to the truly paternal care and solicitude shown by the Holy Father on this melancholy and fatal conjuncture. We may see by his account, that the speedy extinction of a scourge which continued long to ravage other states of Italy, was owing more to the Pope's prudent measures, than to medicines, which were found to be ineffectual. This evinces, that good

laws and active magistrates are frequently the most effectual safeguards against pestilential diseases.

This distemper showed itself in some animals by lowings, by a kind of terror with which they were seized, by a thousand different motions which seemed to arise from that terror, and by a sudden and precipitate flight. Others, chiefly the weak, dropt down dead at once, as if they had been thunder-struck. In almost all the rest was observed a great dejection; they could hardly hold up their heads; their eyes were dull and full of tears; a surprising quantity of mucus flowed from the nose, and of saliva from the mouth; the fever in them was very high; they were so dejected that they could not stand up; their hair stood on end; their tongue, mouth, and gullet, were inflamed, ulcerated, and more or less covered with blisters: at first they showed a great thirst, but soon refused every kind of drink and food: many had a considerable purging; what they discharged was of different colours, always very foetid, and sometimes bloody. Most of them funk under the distemper in a week, being seized with the most violent oppression. Their breath was insufferably stinking, a strong cough was frequently joined to all these symptoms, &c.

It was seldom that the appearances in the viscera were alike in the creatures which died of this plague. The contagion fell sometimes on one part, and sometimes on another, seemingly according to the weakness of that particular part. This Lan-cisi says he was convinced of by opening three bodies. Except the small ulcers observed in the mouth, throat, æsophagus and paunch of each of them, and likewise the gangrenous spots observed in their lungs, all the other effects were totally different. In the paunch of the first, which died on

the third day of the disease, he found a mass of the creature's last food, extremely hard, and what Pliny calls *juvencarum tophum*, that is, an ægagropile. The liver, intestines, and lungs of the second, which died on the sixth day, were intirely sphacelated; the heart and brain of the third were become putrid masses, with scarcely any vascular appearance. He observed nothing particularly remarkable in the fluids.

The young and fat cattle, which had worked little and been well fed, were more easily affected by the distemper, and died sooner, than the cattle which had been made lean by hard labour, and were come to a certain age.

Lancisi thinks that the greater or less abundance of the fluids, and their flowing more or less freely through the vessels, was the true cause of this difference; for the pestilential ferment, says he, insinuates itself more easily into the blood and spirits, and falls more severely on the bowels, when it meets with a greater plenty of fluids liable to be corrupted, and with obstacles which prevent its finding a passage out of the body.

Though the lean cattle did not escape the contagion, and though they generally died of it, yet some of them recovered; probably owing to the less interruption which the pestilential ferment met with in them, than in those that were fat.

What was very remarkable is, that most of the female buffaloes, which were seized with the plague when they suckled their young, did not die. Their teats were ulcerated all over, and none of their young escaped. Lancisi is of opinion that the acrid venom taken in by the nose of the mother, and with her food, flowed with the chyle into the blood, and by that means into the minutest vessels of the udder. There it happily deposited; and as part of the venom was taken off by their young,

and the rest of it remained stopped at the extremity of the lactiferous vessels ulcerated and corroded by that same ferment, the mothers, by means of these salutary sores, frequently escaped death; perhaps as happens to men seized with the plague, who are often cured by a lucky suppuration of buboes.

In the year 1730, a great number of cattle died in Bohemia, Lithuania, Saxony, the Marche of Brandenburgh, and the Duchy of Magdeburgh (*Hist. Feb. Cantarrh. ann. 1730.*) but we have no account of the distemper which carried them off. Perhaps it might be like that which destroyed so many in some of the provinces of France in 1731, the first symptom of which was a white blister that appeared on the tongue. This blister afterwards became red, and ended with turning black and degenerating into a cancerous ulcer, which ate away, and, in a short time, consumed the whole tongue. It was very like an anthrax. This distemper was the more dangerous, because there was no symptom which declared its approach; for the creature which was seized with it ate and drank as usual, till the ulcer had made a considerable progress, and often nothing was perceived till it was too late to assist.

From the year 1740 to 1750, the horned cattle, not only in France, but all over Europe, died in vast numbers of a putrid, malignant, inflammatory fevers, like that which made such havock in Germany and Italy in 1711, and which was called a malignant dysentery. Of all the diseases that have at any time attacked cattle, this seems to be the most dangerous, the most complicated, and the most difficult to cure. Its approach was indicated by a languor and general dejection: the beating of the heart was as quick again as in a natural state, which denotes a very brisk fever. The sick ani-

mal, hanging down its head, could hardly stand upon its feet; it tottered; its loins panted; its eyes were red and full of tears; its horns and ears were cold; a thick, glutinous slaver ran from its nose and mouth; and a convulsive motion was apparent from the head all along the back. The other symptoms were similar to those before mentioned in speaking of the epidemical disease of Augsburgh.

In 1756, the French lost a great number of cattle in Minorca. These animals, transported thither from Auvergne, were little accustomed to the heat of a climate where they were exposed all day long to the burning rays of the sun: for, excepting the middle of the island, scarce any shade is to be found in it. This became the more grievous to them as they naturally delight in a cold climate, and in such it is that they thrive best. In fact, the cattle of Denmark, Podolia, and Ukraine, are the largest, and next to them those of Ireland and England, whilst those of Spain and Barbary are the smallest. They found not in Minorca any thing that could allay in their bowels a heat which they had not felt elsewhere. They had no cooling grafts, for all is burnt up in that island by the month of May. The water, being every where warm, and in many places brackish, afforded but little refreshment to creatures which love it cool and pure. They languished, and lost their flesh visibly from day to day: their breath was hot, and they ended with pissing blood.

We were terrified in 1762 with accounts of an epidemic disease which made great havoc in Denmark, and had advanced to the frontiers of Germany. The following is an account of it, sent to one of the members of the Royal Society of Agriculture at Paris.

“ The contagion spread with great rapidity; the

“ youngest, the most robust, and the most healthy cattle, were the first seized with it, and died the soonest. In most of them a cough was the symptom of the disease. Their eyes became dull, watery, and bleared; and even tears trickled from them. In a day or two after the cows were thus seized, their milk dried up, and this was a sure sign that the contagion had reached them. In the beginning, the creatures were cold even to shivering, nearly as men are on the first attack of a fever. A heat succeeded, and continued for several days: it was most perceptible at the nape of the neck, either by the heat itself, or by the beating of the pulse. The sick animal lost its appetite for eating, but continued to drink freely till the inflammation deprived it of the power of swallowing. A great quantity of insufferably-stinking, snotty matter, flowed from the nose, and the teeth became loose in most of them. Some became costive; but in much the greater number a diarrhœa came on in the beginning, with a discharge of scarce any thing except water, with very little excrement. Towards the end of the disease, the two last joints of the tail became soft and rotten: if the skin which covered them was opened, there came out a fœtid, purulent matter. The gangrene proceeded by degrees even to the horns, which became cold and empty. When the ears and nose became cold, the disease was in the last stage; and then it was that the animal generally died on the sixth or seventh day from its being taken ill.

“ On opening the dead bodies, the gall-bladder was found greatly enlarged, and full of a liquor more like urine than bile. In some of them there was even three pounds weight of this liquor in the bladder; in many, the stomach and

“ intestines were full of worms, yet alive at the
“ opening of the body. There were likewise in
“ the blood-vessels certain insects called *plaice*, be-
“ cause of the resemblance of their shape to that of
“ the fish so named. Sometimes the brain ap-
“ peared dissolved into a purulent water. In ma-
“ ny, the veins were full of black blood. Numbers
“ had the neck inflamed. In others, the inflam-
“ mation fell on the bowels, and sometimes ano-
“ ther part of them was found gangrened. The
“ stomachs were full of food not digested; and
“ that food was so dry, and so much compacted
“ together, that it could not be separated without
“ great difficulty. Livid and black spots on the
“ stomach and intestines showed evidently a gan-
“ grene. In some animals, the liver and spleen
“ were covered with small tumours, so hard that
“ they could not be broken, and they felt like
“ grains of small sand under the fingers; while the
“ rest of the substance of these viscera was, on the
“ contrary, so soft, that it could scarcely be
“ touched without piercing into it. Some dead
“ bodies afforded no sign of any distemper. The
“ blood that was taken from the animals was of a
“ clear red, and discovered signs of great inflam-
“ mation by its frothing and smoaking, and not
“ having any liquid in it after it had cooled: the
“ whole was one coagulated mass, which might be
“ cut like a jelly.”

In the years 1746, 1754, 1761, and 1762, there appeared among the sheep in the neighbourhood of Beauvais (in Picardy) a contagious disease which the French commonly call *clavin*, or *claveau*, and which is in fact no other than the small-pox, as was before observed. It is, of all the contagious distempers which affect sheep, the most easily communicated, and that to which they are the most liable. Like the small-pox, too, it is distinguished

into the distinct or mild, and the confluent or malignant.

The Royal Society of Agriculture at Paris having received the following very particular account of this disease, as it appeared in 1762, from M. Borel, Lieutenant-General of Beauvais, and Member of the Society of Agriculture of that city, gladly pay him the tribute of praise justly due to the zeal and diligence which he manifested on this occasion. He himself examined the condition of the sheep in many villages and hamlets, in order to become perfectly acquainted with the symptoms of the disorder, which he has described with a precision that shows he judged and saw with his own eyes.

The disorder manifested itself by a want of appetite and a dejection in the animal. Some perceived it twenty-four hours before the eruption; the most attentive perceived it two or three days sooner; but the greater part did not notice it till after the eruption had begun. The disgust was proportioned to the degree of the malady; for the sheep that were affected continued to eat, those that were most severely attacked took no food of their own accord, people supported them as well as they could; they were very thirsty, and water was given to them all. As soon as they were seized with the disorder, they ceased to chew the cud; their eyes were heavy, swelled, and watery; they became very dim, and frequently the eye-lids were so glued together, that the creatures could not see. Many of those which had been cured had lost one eye, and others were quite blind: a deposit or translation of the pocky matter being made, brought on a suppuration which destroyed the whole substance of one or both eyes; but these deposits contributed much to a recovery. There flowed from the nose a thick, tough matter, of the

colour of pus, generally white, seldom yellow. Their strength failing them to follow the flock, they laid down, and remained in the place where it may be said they fell. Their ears were very cold; though this was not always the case. They were quite motionless, and collected into the smallest compass possible, with the head inclining as much as could be to the ground, the tail drawn in between the legs, and the hinder parts brought near to the fore ones, without seeming to be griped. The oppression they laboured under was in proportion to the violence of the disorder. When the attack was mortal, they groaned during the last twenty-four hours of life, and their loins palpitated strongly. If they recovered, their wool fell off from the places where there had been an eruption. Their excrements were nearly the same as in a state of health, but rather dryer, and blacker than in the natural state. The pimples resembled exactly those of the small-pox. They were of different forms and different colours. Some were perfectly round and distinct; others confluent, and of an elliptical shape. All of them were at first red and hard. The distinct sort became afterwards white and soft, suppurated, dried up, and fell off in scales. In the confluent kind the pimples were so near together that they touched each other; they became of a purple colour, and instead of rising and turning white, they appeared flat and became black. The fever, heat, thirst, and dejection continued, attended with a difficulty of breathing, and working in the loins. Some died so early as third day after the eruption. The more the head was affected, the greater was the danger, and the speedier the death. Those that outlived the disorder, were long in recovering. Some did not recover in less than two months, others at the end of six weeks, or a month: in

the distinct kind, they generally recovered in a fortnight: but in both sorts, several died at the end of these periods. People were at first of opinion, that the sheep fed in moist pastures were more liable to be seized with this disorder than those fed in dry pastures: but it was afterwards observed that there was not any difference between them. The sheep were seized in the winter as well as in the summer. In several places the infection spread without any immediate communication with the sick sheep: in others, it seemed to be the effect of their coming near to one another. The eruption appeared chiefly on the head, on the inside of the fore and hind legs, on the belly, and around the anus. Some sheep had but very few pimples. These the country people called the flying small-pox. Some had pimples only on their legs, others on their ears only, and some again had only one cluster of the breadth of a crown-piece. A sheep had such a cluster on one ear, which it treated so roughly, that the ear remained curled up, and displaced from its natural position. Another had one on its foot; the hoof fell off, and the creature remained lame ever after. The eruption was generally complete by the fourth or fifth day. The inside of the mouth was full of pimples, which would have prevented the sheep's eating even if it had not had a disgust to food. The breath was excessively stinking. M. Borel observes, that when a flock of sheep was seized with this distemper, at least one half or two-thirds of them was very sick. In most places, no attempt had been made to cure it, the country people being persuaded that there was no cure for it, because they had never seen their fathers administer any; only some of them assured him, that the open air was better for the sick sheep, than housing them.

This gentleman, not contented with examining
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the symptoms of the disease in the living, endeavoured to discover its effects in the dead bodies. A sheep which was first observed to be sick on a Thursday, continued in the field all Friday, and on Saturday morning was found dead in the sheep-fold: it was brought to M. Borel in the afternoon of the same day; signs of putrefaction appeared already in it by an offensive smell, by a livid, greenish colour upon its neck, and under its fore and hind legs, and by the largeness of its lower belly, which inclosed a great deal of infected air. This sheep had not any pimples on the head, nor was that part of it at all swelled; only two pimples were found on the upper, and two on the lower part of the tongue; and in those places the skin peeled off as it does from a tongue put into boiling water. On raising the eye-lids, it was seen that the eyes had lost their brightness and transparency, and that more in one than the other. The pimples were numerous on the belly, under the fore and hind legs, and on the neck and throat. They appeared like tumours, or white pustules, round, flat, and of a sixth, a fourth, or a third part of an inch in diameter. They did not pierce deeper than the skin, and moved with it. The matter of which they were formed, had not yet made pits, as in the white pustules of the small-pox. On opening them, they appeared like a pinguous tumour; some were excoriated in the middle. It was presumed that they had not become white till after the death of the creature, and that they were red before, as in the other sheep during the first days of the eruption. The remains of a sanguous humour, of the colour of coffee, were found in the nostrils; but no judgment could be formed of its mucosity at the end of twelve or eighteen hours after death, when a putrefaction had begun. The lower belly being opened, the cawl appeared of a dead, blackish

red, and the fat of it had not that cohesian and consistence which it has in sheep killed when in health. The liver was of a dark green colour; which colour penetrated about a twelfth part into the substance of it, in some places more, in some less; and the part so coloured was brittle, as if boiled. The gall-bladder was flabby, and seemed to have contained more bile, and that thinner, than in its natural state. The inner coat of the first stomach was loose and wrinkled, of a green colour, and prodigiously full of white lenticular pustules, of the same nature as those on the skin, but smaller in diameter. The stomach contained a greenish liquor in small quantity. The second stomach contained also but little. The third was very full of food pretty well chewed, and as green as the grass of which it was the produce. It was also much extended with a very rarefied and foetid air. The small guts were almost empty. In the colon and cæcum were excrements of a middling consistence. The kidneys were like the liver, green and dry on the outside. The bladder had little urine in it. The lungs were flabby, and of a dark, livid red. Some small tumours were observed in them, like those on the skin, but round and thick. The heart appeared larger than in its natural state. The right ventricle contained a very black blood: a cled of blood taken out of the inferior vena cava was black in its upper part next the heart; but in its lower part next the liver it was yellow, and resembled that coat which covers the blood in pleurisies. The head of this sheep was not opened, as well on account of the putrefaction, as because the disease did not seem to have fallen on that part. M. Borel adds, that if a child had died at the same period of a disease, and with the same symptoms, it would be thought to have died of the small-pox striken in. The resemblance between the *claveau*

in sheep, and the small-pox in men is very striking, whether we examine it in its beginning and progress, or in its effects and consequences in the sheep that were cured. In many of these the skin of the head, especially about the lips, was seamed as the skin of a human face is by the confluent small-pox.

It were to have been wished that M. Borel's occupations had permitted him to notice with the same care and exactness the effects of some medicines, which were pointed out to him at the time by one of the members of the Royal Society at Paris, and to pursue the experiments then proposed to him. The questions which that society put to him may, however, help to direct others on a similar occasion; and I shall therefore transcribe them here.

1st. Are old sheep more subject to the *claveau* than young ones? Is the *claveau* apter to be of the confluent or malignat kind, and consequently more dangerous in the former than in the latter? M. Borel answered, that no difference had yet been observed between the old sheep and the young, with regard to the height to which the malignity or other symptoms arose. The society, however, wish that this important point may be ascertained by more accurate observations.

2d. Are the lambs subject to this disorder? Is the distinct or mild kind the most common amongst them? Are they subject to a looseness in either kind of this distemper? Have they the discharge by the nose in the confluent kind? Does this discharge precede, or does it accompany the eruption?

3d. At what time precisely does the eruption appear, and how long also does it last, in the one and in the other kind of this disease? Does it vary according to the kinds of the disease, and according to the age of the animal?

4th. After the eruption, are the symptoms lessened in the distinct kind? Do they become more alarming and seem to increase in the confluent kind?

5th. Is a sheep which has recovered of either the one or the other kind of this distemper, ever attacked with it a second time, or oftener?—The country people assured M. Borel, that they never knew a sheep attacked a second time by it.

6th. Could not inoculation be tried on a sound sheep, or on an uninfected lamb, which has been prepared before-hand? What would be the issue of such an experiment, made with all possible precaution to guard against the spreading of the contagion?

7th. If a sheep cured of the *claveau* in the natural way is inoculated, will it be infected?

8th. What would be the consequence of inserting some of the variolous matter into an ass, a mule, a horse, a bullock, a dog, or, in short, into any animal of a different kind? What would be the effects of inoculating a sheep, or other animal, with the variolous matter taken from the human body?

9th. Prepare some sheep as for inoculation, and expose them afterwards to be infected in the natural way? will they be infected, and of what kind will the infection be?

10th. Inoculation not having had any effect, expose the sheep to the *claveau* in the natural way, will they be infected?

Plenciz, a celebrated physician at Vienna, in a treatise on contagious diseases, printed by Trattner, in 1762, has taken into consideration, in p. 142, &c. the havoc made by the distemper among cattle for thirty years past, in almost every country in Europe. He ascribes the cause of it to small worms, and founds his opinion on what he ob-

served by the help of a microscope in the several ulcers which extended from the mouth and throat to the stomach and lungs of the distempered animals. He cites the testimony of Rodius, *Cent. 3, Observat. 61, & 62.* that of Bidloo, and that of Bono in his letters to Valishieri.

The progress of this cruel disease having been such towards the end of the year 1761, that the symptoms of it became daily more and more severe, this zealous author determined to search first into the cause of its spreading so rapidly, and next into the means of getting the better of it. These two points are the subject of a small work serving as a supplement to that we have been speaking of, viz. *Additamentum ad Tractatum de contagione, p. 142, 143, 144, &c. seu de lue bovina ad finem vergente anno 1761, epidemia grassante, &c.*

Michael Sagar, physician in the circle of Iglaw, in Moravia, has given us the history of a distemper which reigned among the cattle in 1764. It was printed in 1765, by Kraus, at Vienna, under the title of, *Libellus de aphthis pecorinis anni 1764, cum appendice de misribis pecorum in hac provincia tam frequentibus, eorundemque causis et medelis preservatoriis.*

These two works contain excellent observations, and cast a great light on the subject; as does also the work of M. Ens, intitled, *Disquisitio Anatomico pathologica de Morbo Bovum Ostervicensium.*

We find in the second volume of Sydenham's works printed at Geneva in 1736, by the brothers Detourne, not only all that Bernard Ramazzini has said of the constitutional epidemics of 1690, 1691, 1692, 1693, and 1694, but likewise a collection of what Schroock, Harder, Valentinus, Garhliep, Behrens, Rayger, Steggmann, Schelhamer, Hoyer, Gerbezius, &c. have written on the epidemical constitutions of different countries at different times. They have all been sufficiently attentive, whenever the contagion extended to any

kind of cattle, not to neglect this circumstance, though it was not, so much as might have been wished, the principal object of their writing. We are, however, obliged to physicians, who, whilst they search into the causes of diseases fatal to men, at the same time cast an eye on those of cattle. *Sunt enim animalia post hominem, ita ars veterinaria post medicinam secunda est.* Veget.

Of the Causes of the contagious Diseases of Cattle.

THE constitution of the air, and the quality of their food, are the original causes of all the epidemic diseases of cattle. They breathe the same air as we do, and consequently must be affected by its various temperature, its changes, its gravity, its lightness, its greater or less elasticity. The vapours, the exhalations, and whatever it carries with it must make on them at least as much impression as on us, and even more, since, not being cloathed, as we are, they are more exposed to the immediate contact of the air; so that what is contained in the atmosphere finds an easy admission by the mouth and nose, and being lodged in their hair, may insinuate itself into the body, and so occasion many disorders.

It appears that whatever in the air is hurtful to animals, affects them chiefly by the mouth and nose: for these effects generally show themselves first in the head or stomach, and frequently in both at once. Hoffman is clearly of opinion that morbid fermentations are mixed with the blood by means of the saliva, more than by any other means. That liquor, whether it be swallowed constantly, or only when it accompanies the food, carries the ferment with it into the stomach and intestines, where, mixing with liquors easily susceptible of putrefaction, or of being affected by any particular

ferment, the liquors are in this depraved state carried with the chyle into the body, and produce effects similar to their different qualities, either on the body in general, as in a fever, or on some particular part: whereas if the venom entered by the pores, it would meet with liquors in continual motion, and therefore not so susceptible of putrefaction, or of being affected by any peculiar ferment.

That the air is the great source of contagious distempers, was an opinion of the most ancient writers. Hippocrates (*Sect. 4. de Flatibus*) looks upon the air as the source of all disorders. Virgil (*Geor. Lib. 3.*) promises to teach us the causes of all the diseases of cattle; *Morborum quoque te causas et signa decebo.*

“ The causes and the signs shall next be told,
“ Of ev’ry sickness that infects the fold.”

Yet he mentions only the air, as if that was the sole cause.

*Hic quondam morbo cœli miseranda coorta est,
Tempeſtas, totoque autumni incanduit aſtu,
Et genus omne neci pecudum dedit, omne ferarum,
Corrupitque lacus, infecit pabula tabo.*

“ Here from the vicious air, and sickly skies,
“ A plague did on the dumb creation rise:
“ During th’ autumnal heats th’ infection grew,
“ Tame cattle and the beasts of nature slew;
“ Pois’ning the standing lakes, and pools impure:
“ Nor was the foodful graſs in fields ſecure.”

Livy too (*Lib. V. Decad. 1.*) seems to impute to the air a pestilential disease which carried off both men and animals in his time.*

Though the air is unquestionably a most powerful agent in communicating contagious diseases, yet

* *Trystem hyemen ſize ex intēperie cœli raptim mutatione in contrarium ſu'la, ſize aliā d. caſiā gravis pestilensque omnibus animalibus aſlus excipit.*

it is not the only one; for if it were, how comes it that the pestilential diseases which at different times have destroyed mankind, have spared the beasts of the field? Thucydides, in his description of the plague of Athens (*de Bell. Pelopon. Lib. 2.*) does not say that it extended to beasts: he only relates, that the carnivorous animals would not touch the bodies of those which died of the plague, and that those which were so voracious as to eat of them died; which is a tacit proof that the other animals did not die of it. The plague ravaged the Roman Empire during fifteen years under the Emperors Gallus and Volusian (*Zonar. tom. 2.*) in the year 263, it killed five thousand people in one day in Rome only (*Baronius, Annal. tom. 2.*) Under the Emperor Justinian, there died of the plague at Constantinople, from five thousand to ten thousand people likewise in one day (*Procop. de Bello Pers. Lib. 2.*) Guy de Chauliac speaks of a plague which appeared in his time, viz. in 1348, so extremely severe, that it swept away three-fourths of mankind from off the face of the earth. According to Rondelet, it made dreadful havock in France, Germany, Italy, and Spain, in 1450. Valeriola says that, in 1553, men dropt down dead of the plague in Narbonese Gaul, whilst they were talking together or walking, as if they had been struck with thunder. Jerom Mercurialis relates the same thing of that which appeared at the same time at Padua and at Venice. Zacutus speaks of a most dreadful plague which happened at Lisbon in 1601. In fine, it appeared in Moscovy in 1655, in England in 1665 and 1666, in Poland in 1708 and 1709, at Marseilles in 1720; and yet the authors who have spoken of these terrible scourges make no mention of their having affected any other creatures than mankind. Can it be supposed that all of them neglected or forgot a circumstance of so great consequence? Their silence is a convincing proof that all epi-

mical diseases do not arise solely from the constitution of the air.

It may be objected, that as the air acts differently on different bodies, so the diseases which the air communicates to men may not affect other animals, nor those which are peculiar to any one species of animals affect any other species: for what proves mortal to one species does not to another; and that there is a plague for men, another for horses, another for cattle, and another for sheep. A sound bullock put into the same stable with a glandered horse, does not catch the glanders. A bullock put into a house with sheep ill of the small-pox, does not catch that disease, nor do horses; and sound sheep do not catch the glanders or farcy from horses, when confined with them in the same stable: and yet one should be cautious not to mix sound animals of any species with diseased ones of any other: for men who had not so much as a scratch on their hands have been seized with a true anthrax by opening the bodies of cattle dead of a contagious distemper; and almost all the cow-herds who were appointed to watch an infected herd, have been seen to fall into malignant fevers accompanied with a gangrene.

Independant of the air, it is certain that many epidemic diseases take their rise from the bad qualities of food. If the bread-corn is any way dis-tempered, it never fails to bring on disorders among the country-people; of which a remarkable instance is recorded in the History of the Royal Academy of Sciences for the year 1710; viz. that the peasants of Sologne, who lived on rye which had the spur, were seized with a dry black gangrene, which began in the toes, ascended insensibly, and made their limbs drop off, in such manner that some of them were alive in the Hotel-Dieu at Orleans, with nothing left but the trunk of the body. Grass

equally distempered becomes equally pernicious to the cattle which are fed with it. The distemper in grafts called rust (*ærugo & rubigo,*) has always been looked upon as very dangerous. The Holy Scriptures speak of it as an effect of the wrath of God. Pliny reckons it more hurtful than hail; and therefore it was, says he, that Numa Pompilius instituted festivals, called *Rubigalia Festa*, to avert the effects of it. They were celebrated in the month of April, because this distemper usually begun in that month. The nature of it is not yet well understood. It generally begins when, in hot weather, there has fallen a plentiful dew, which was supposed to break the vessels of the leaves and stems of plants, from whence issued a thick, extravasated juice, which being dried by the sun, was turned into a red powder which adhered to the plants, and did them great injury; for they soon after appeared gangrened, if we may apply this word to plants. Count Francesco Ginnani, in his work intitled *Delle Mallattie del Grano in Herba, C. 5. Part. II.* attributes this distemper in vegetables, not to the extravasation of the juices, but to the hatching the eggs of insects. He has seen them, he says, between the outward and the inward covering of the leaves. Plenciz, in the work before-mentioned, quotes the microscopical discoveries of Needham, the Observations of Mercurialis, and the *Acta Eruditorem* of Leipsick for the year 1718, in order to demonstrate that what is properly called the *Rust*, depends on the eggs of certain vermin, which being laid on vegetables, penetrate the outer skin, hatch, and afterwards multiply there. Calm and temperate weather, rather warm, and in which there are dripping rains without a cloudy sky, favours their production. This, says he, is what was experienced in Austria in the year 1751, and what was observed on the 31st of March and 30th

of June, 1759, on both which days it did not cease to rain, though the sky was clear. In the former of these cases, almost all the vegetables in the country were covered with rust; and in 1759 the wheat was greatly damaged by it. This opinion of the cause of this distemper is adapted by M. Tillett, by Loewenhoeck in his 109th letter to Van Leeween, and by M. Duhamel. Whatever be the case as to this opinion, all agree that damaged or corrupted food must be as hurtful to other animals as to men. Clover, sainfoin, and lucerne are certainly wholesome plants; but let them be attacked with this distemper, they become as hurtful as the crow-foot, (*ranunculus*) tithymal, (*spurge*) or hellebore; and these too, dangerous in themselves, become more so when thus affected. This rust, says Ramazzini in his *Observations on the Epidemic Distemper at Modena*, seems as corrosive as spirit of nitre. The pastures corrupted by it were so fatal to cattle, that whole herds were carried off. In 1693, the grass was infected by it in Hesse, and accordingly, says Bernard Valentine, the cattle died there by whole droves. The same happened in Carniola in 1712, and in the Ferrarese in 1715; and the same consequences ensued. Rye which has the spur, is not only fatal to men, but occasions internal and external ulcers in hogs and geese.

In the months of July and August, 1756, there was a mortality among the cattle in Minorca, which having been transported thither, could not bear the heat of the climate, as was mentioned before. The herdsmen who attended them fell sick; but the disease was much more severe in those who had been so imprudent as to eat of the flesh of the sick cattle; for all of them were seized with a malignant fever, accompanied with a gangrene which showed itself on the second day, especially at the elbow and heel.

The rust is to grass, what a corrupted state is to flesh: if flesh in this state occasions fevers amongst men, why should not vitiated plants have a similar effect on cattle? Independent of this, there are plants which are in themselves prejudicial to cattle. We see them frequently die in marshy ground, whilst those fed on the neighbouring heights are healthy. In our pastures, hurtful plants grow among the good, and the care of selecting the latter is left to the cattle. It is true that the Creator has indued them with an instinct to distinguish the hurtful from the good; but the former often grow so close to the latter, that it is almost impossible for them to crop the one without eating of the other. We see the crow-foot growing every where: all the species of it contain an acrid juice, especially the parsley-leaved marsh crow-foot, *ranunculus palustris apii folio*, otherwise called *herba scelerata*, a name which sufficiently indicates its noxious quality. This grows by the sides of rivers, and is indeed not so often met with as the acrid upright meadow crow-foot, *ranunculus pratensis erectus acris foliis*, and the creeping, hairy meadow crow-foot, *ranunculus pratensis repens hirsutus*, which are very common in our meadows, and though less dangerous to cattle, yet are injurious to such as eat them. The *ptarmica vulgaris*, *dracunculus pratensis*, which some likewise call the sneezing-plant, is not less common nor less acrid than the *ranunculus*. We also find in them the spurge, (*tithymalus*) a very acrid plant, and the small kind of hemlock, which ought to be banished from them. A careful observer will remark other plants perhaps equally prejudicial; and the husbandman who suffers such plants to grow in his pastures is inexcusable: for when one or two of the creatures fed on them become sick, the disease soon communicates itself to many, already pre-disposed, by the effects

of their food, to receive the infection; and thus it is insensibly spread.

Water, which should be accounted an aliment, may, by bad qualities communicated to it, contribute greatly to the production of epidemic diseases; and still more so, when assisted by distempered or acrid food.

We read in the philosophical transactions, that, during the plague in London, there was collected from off the surface of water, exposed in a vessel to the air, a blue pellicle, which having been mixed with bread, and given to a dog, killed him in twenty-four hours. But without being infected by these pestilential particles which drop upon it from the atmosphere in a pestilential constitution of the air, the water may be charged with other substances pernicious to animals, taken up whilst passing through mines of lead, copper, &c. It sometimes carries with it gypsous matters and selenites, which may form concretes or obstructions, and cause many diseases. The waters in Minorca are of this kind: having too short a run to drop the earthy particles with which they are loaded, they constantly form strong concretions adhering to the sides of the vessels in which they are contained. Standing, heavy, slimy water, loaded with many insects and their eggs, as well as with many particles from the animals and vegetables which die and rot in them, is the cause of many diseases to cattle which are often obliged to drink of it. Water is both the most universal dissolvent, and the aptest vehicle for carrying noxious particles into the blood.

Standing putrid water is not more pernicious by reason of its viscidity, than it perhaps is on account of vast numbers of small worms which are swallowed along with it, and live and grow in the sto-

machs of cattle; as do also their young brood. These by their motion irritate, and by pricking inflame the stomach and intestines, from whence proceed spasms and convulsions, somewhat similar to what arises from the use of acrid or distempered food: for these too irritate the stomach and intestines; and the ill effect that will follow is an acceleration of the peristaltic motion of the intestines; whence more frequent discharges, and even bloody flux. The acrimony, being sometimes so strong as to erode the coats of the stomach and intestines, occasions inflammations and intolerable pain, convulsions, &c. and the inspection of the dead bodies shows us, that in contagious diseases, the stomach has been inflamed, and that the internal coats, by the livid spots in them, which are sometimes continued down the whole length of the intestines, had a tendency to a mortification or gangrene.

Of the Cure of the contagious Diseases of Cattle.

IT has been already said, that the constitution of the air is one of the general causes of contagious diseases among cattle. M. Le Clerc, treating of the epidemic diseases which desolated Russia, lays down the following rules for judging of the nature of contagious diseases, and of the method by which they may most probably be cured. " An unexpected distemper," says he, supposing the case, " breaks out at once with alarming symptoms and terrible effects, and communicates itself from creature to creature. The effects of this distemper, howsoever complicated they may be,

“ teach me the time, the order, and the means of
“ correcting an evil arising from a cause unknown.
“ Nature also shows me, by the crisis she brings
“ on, the manner in which the disorder should be
“ expelled. Moreover, I attentively consider the
“ qualities of the air we breathe, the situation of
“ the place, the qualities of the soil, the kind of
“ life which the inhabitants lead, the disorders
“ which at the same time affect cattle or plants,
“ the neighbourhood of mines, marshes, standing
“ water; and if I do not trace the cause in any of
“ these, I look back, and search for it in things
“ already past. I reflect on the seasons anterior to
“ the disorders: I examine the time, the course,
“ the duration, the anticipation, the changes, the
“ temperature, and finally the mixt or extraor-
“ dinary qualities of the seasons, and the winds
“ which have been most frequent during that time.
“ I then reflect on the nature of the diseases which
“ these variations have given rise to; nor do I
“ lose sight of the changes these diseases have un-
“ dergone. If in my researches I at length find
“ one or more causes capable of producing the dis-
“ order which I was unacquainted with, I com-
“ pare the effects of the distemper with the power
“ of the cause, and then draw my conclusion from
“ their resemblance, or analogy. Have southerly
“ winds reigned long? I answer, that these winds
“ are naturally pestilential: they may therefore
“ produce pestilential fevers. Do the mixed or
“ extraordinary qualities of the seasons, their heat
“ and moisture united, occasion the distemper?
“ The effects, being truly discovered, make known
“ the state of the fluids and solids during, and
“ even after, such a constitution of the air. The
“ disorder being known, (as far as our limited
“ knowledge can reach) I form my indication of
“ cure. I guard the infected body against the

“ effect of the present venom, by giving of choice,
“ such medicines as have been employed with the
“ greatest success in such diseases as have been par-
“ ticularly marked by similar effects. These are
“ the means of coming at the knowledge of ve-
“ nom; a knowledge which is not otherwise suffi-
“ ciently manifested to our senses. Does the in-
“ temperature of a season give me room to think
“ that it is the efficient cause of any disorder? I
“ have immediate recourse to the hydroscope and
“ engyscope. The first informs of the real state of
“ the air; the second gives me an insight into the
“ nature of the particular salts then diffused in the
“ atmosphere (a). I then expose to the air every
“ substance which the salts of the air can alter, as
“ silks died of such particular colours as are tar-
“ nished by the nitrous or sulphurous acid, and
“ are turned black by the vitriolic acid. I more-
“ over observe the alterations which the vapours
“ of dew have produced on white linen before it
“ has been washed with ley or soap.”

In all the cattle which have died of contagious diseases, and have been opened, there have been evident marks of inflammation and putrefaction. These distempers may therefore be reduced to the putrid and the inflammatory kinds. Putrid diseases differ among themselves, as do likewise the inflammatory: but that difference consists only in the greater or less degree. The epidemic distemper of 1690 showed itself with pustules. Whenever eruptions appear on the skin, it is a certain proof that the cutaneous vessels are obstructed with a matter that cannot circulate in so minute vessels, and therefore an inflammation arises. In almost every creature that was opened in 1693, there was

(a) The curious may like wise consult on this subject, *Les Experiences Phys. de Poliniere*, Tom. II. p. 306, & seq.

found in the lungs a suppuration, which must have been preceded by an inflammation. The distemper which proved so fatal to the cattle in Lower Hungary in the year 1712, appeared with pustules which contained an extremely foetid matter. The stench of that matter, and of the humour which flowed from the mouth and nose, proved that a putrefaction was joined to the inflammation in that disease. The author who has described the epidemical constitution at Augsburgh, declares the distemper of the cattle was putrid and inflammatory. In the contagious distemper which prevailed in 1740 and the following years, the fever appeared to be inflammatory, malignant and putrid. The contents of the first stomach were very putrid, and the air which proceeded from it was extremely foetid: those of the second looked as if they had been dried: its membranes were black, gangrened, and easily torn to pieces; as were also the membranes of the third stomach and of the intestines, which likewise contained sometimes purulent matter. Black spots and hydatides were observed on the liver, the lungs, and on the meninges of the brain. In the cattle which were opened in Minorca in 1756, traces of inflammation, terminating in mortification, were observed in almost all the bowels. The appearance of the sheep which died of the small-pox in the neighbourhood of Beauvais, likewise confirms that the disorder was highly inflammatory and putrid.

As it has constantly appeared upon opening the bodies of cattle which died of contagious distempers, that the diseases were either inflammatory or putrid, the method in which these disorders should be treated is hereby pointed out. When they are inflammatory, the first intention should be to cool the too-great heat of the blood, to lessen its rare-

faction, the velocity and force of its motion, in order to take off or lessen the obstructions in the capillary vessels. These purposes are answered by plentiful bleedings, by so much the more necessary in cattle, as the action of their vessels is stronger than in men. The heat and strong action of the vessels soon dissipate the thinnest watery part of the blood, whence farther obstructions ensue; and hence it is that inflammatory diseases are most dangerous in the most healthy constitutions, and in the most robust animals. Evacuations become therefore the more necessary, lest suppurations or mortifications should be the consequence. Plenty of cooling and dilating liquors should be given at the same time.

If, on the contrary, signs of putrefaction appear, the first passages should be immediately cleared of whatever putrid substance they contain, or of any substances that may become so; for if they were to remain there, they would communicate their putrid taint to the blood. This end is obtained by glysters and purging medicines. The first passages being thus cleared, digestion is better performed, and room is made for antiseptic medicines, which may destroy the remaining infectious venom.

Comparative anatomy teaches us, that the structure of other animals differs but little from ours. The animal and vital functions are the same; the secretions are made in the same manner. Why then should not the same medicines be used in their disorders as are used in ours?

In case a contagious epidemic distemper amongst cattle is attended with a cutaneous eruption, it will be first of all necessary to examine what kind of eruption it is: for cutaneous eruptions proceed sometimes from the violence of the fever, from acrid and stimulating substances taken down into the stomach, or from medicines of too warm and

cordial a nature. In this case, no good is to be expected from the eruption. But sometimes it is an effort of nature to relieve herself by throwing the peccant matter out upon the skin, and in this case the eruption is favourable, and should be encouraged.

In the first case, the fever is high, the heat considerable, and all the signs of inflammation appear. Recourse must therefore be immediately had to bleeding, and to cooling and diluting liquors, such as water in which salt-petre or sal-prunel has been dissolved; an ounce in about fifteen pounds (or pints) of water. In lieu of salt-petre, vinegar or spirit of vitriol may be mixed with water in quantity sufficient to give it a grateful acidity. The food should be light; such as fresh grass or other plants, and bran boiled in water. By these means the progress of the inflammation may be stopped, or a resolution may be obtained of the vessels already obstructed.

In the latter case, the above method must be avoided: evacuations might strike in the eruption, and thereby prove mortal. The eruption must, on the contrary, be encouraged, by giving an ounce of theriac to a bullock or a horse. The eruption will likewise be kept up by giving them daily a spoonful of the flower of sulphur with bran. Their drink should be water in which sea-salt has been dissolved. That salt is a diuretic which helps to depurate the blood by urine. The depuration should be aided by a seton made in the dew-lap of a bullock, by piercing it through with a bistury, and drawing through the incision a rag of linen or a skein of thread, daubed with basilicon. Care must be taken to draw the rag or skein through the wound daily, so as to leave a fresh piece of it in the incision, in order to keep it clean. If, notwithstanding these means, the eruption does not keep

out, the dose of theriac must be repeated, and a decoction of sarsaparilla and sassafras, or of contrayerva, must be given for drink.

The contagious distemper which appeared in Hesse in 1693, terminated in a pulmonary phthisis, which might have been prevented, or rendered milder, by bleeding in the beginning, and by cooling and nitrous or acidulated drinks. If it could not be entirely prevented, it might have been very proper to have given to the sick animals half an ounce of sulphur, and the same quantity of cinnabar of antimony mixed with bran; at the same time rubbing them heartily and often, in order to determine to the pores of the skin the matter which would have produced an abscess in the lungs. When the small-pox does not suppurate kindly, the disease often falls on the lungs; and by the rule of contraries, a cutaneous eruption, a determination of the humours towards the skin, often draws the humour from the lungs, and is frequently seen. An ulcer, an issue, make drains which often relieve the lungs. The phthisis might therefore have been thus prevented, seeing it proceeded from the same cause which three years before brought on the small-pox. This is making nature our guide.

The contagious distemper which reigned in France and over all Europe from 1740 to 1750, and which had appeared before in Hungary, Germany, and Italy in 1711 and 1712, showed itself with evident symptoms of an inflammatory, malignant, putrid fever. As the throat, stomach, and intestines were greatly irritated by an extremely acrid humour, the first care, in such a case, should be to allay the acrimony by mild drinks which resist putrefaction, and to prevent the inflammation it may cause, by bleeding. With this view, a glass of oil of olives, or of linseed oil, with half as much vinegar, should be given morning and evening, in a pint of warm

water. During the two first days, a decoction of forrel rendered gratefully acid with vinegar, or spirit of vitriol, should be given, and for food only bran boiled in water, in order to give time to the stomachs to free themselves of the food lodged in them, as was before observed; after which it will be right to give them an ounce of crocus metallorum in powder, or, which is yet better, the ounce of crocus may be infused for twenty-four hours in a quart of white wine, and the whole be given at once through a horn. A quart is the dose for horses, bullocks, and cows, and half a pint for sheep. The creatures which take this remedy should be kept all the day warm in a stable, and not be suffered to eat till the evening; the effect of this medicine being as much by the skin as by purging. The efficacy of this medicine has been often experienced; yet the violence of the distemper requires that we do not stop here. The seton before recommended is here of the greatest utility. If people in the country cannot procure the crocus metallorum, they may substitute in its place two ounces of dry briony roots, or one ounce and a half of those of asarabacca. The crocus metallorum is however by much the best. In order to cause a freer discharge from the mouth and nose, powder of hellebore, or of horse-chesnut, may be blown up the nose, and the mouth may be washed with a mixture of vinegar and theriac: or if the nose is dry, it may be proper to throw up into it, with a syringe, some barley-water and honey; and if a stimulant is wanted, some flower of mustard may be added.

If, notwithstanding this treatment, the symptoms do not abate, recourse must be had to the Peruvian bark, half an ounce of which, mixed with two drams of sal-prunel and twenty grains of camphire, should be given night and morning. These

medicines are powerful preservatives from putrefaction, especially the bark, the virtue of which in gangrenes is well known. Country people, who cannot afford the expence of these medicines, may substitute in their place half an ounce of gentian-root with half an ounce of kitchen-soot, this abounding most in sal-ammoniac. The sal-prunel and camphire, may be added to them, because these medicines powerfully promote the secretions by the skin and kidnies. Instead of the theriacated vinegar, one may use strong vinegar, in which a handful of salt has been dissolved, and a few heads of garlic bruised. It is proper to observe that, if the animal has not been bled in the beginning of the disorder, bleeding should not be attempted now; for it will do much hurt.

When hard tumours or buboes appear on the breast, or groin, as happened in the contagious disorder in Germany which succeeded to that in Hungary, cupping-glasses are thought to be of great use, to draw the humours the more to these parts. They should be scarified, and brought to suppuration as soon as possible by applying warm ointments and poultices; and to determine the remaining peccant matter to the pores of the skin, half an ounce of soot should also be given daily in a glass of theriacated vinegar. A bubo in the glands about the throat and neck has often proved a happy crisis, and carried off pestilential fevers. The theriacated vinegar consists of two ounces of theriac dissolved in a quart of common strong vinegar. The strongest is the best.

If a red blister, turning black at the bottom, is perceived on the tongue of an animal, such as was observed in the years 1731 and 1765, that blister is much to be feared. It is a pestilential pustule which may carry the creature off in twenty-four hours; and therefore the cure must be very speedy.

The whole of this blister should be immediately cut out and carefully separated from the live flesh. The skin and every part which appears black should be taken away, and the wound be afterwards washed three times a-day, at least, with strong vinegar in which some salt has been dissolved; and this should be continued till the wound is cicatrised.

The Royal Society of Agriculture at Paris have published the following method, which was found successful in the generality of Moulins, where it was tried on three hundred and thirty horned cattle, all of which were cured.

“ The first care was to administer preservatives to the sound cattle. To this end they were bled in the jugular, their mouths were washed frequently, acidulated nitrous drinks were given them, and their habitations were fumigated.

“ The lotion was made of vinegar, pepper, salt, and affa-fœtida bruised. The whole was mixed together, and steeped, shaking it at different times. The tongue, and all the parts of the mouth and jaws, were then strongly rubbed with this liquor. Every part of the tongue was in an especial manner rubbed with a cloth wet in the liquor. Sometimes half an ounce of sal-aminoniac was added to this lotion.

“ The drink was barley-water, with an ounce of salt-petre, and vinegar enough to render it gratefully acid.

“ The fumigation consisted either of vinegar thrown upon live coals in the stable or cow-house; or of four handfuls of juniper-berries, two of wormwood, two of elecampane root, and two of leaves of sabine, with an ounce of myrrh; the whole powdered and burnt on a chafing-dish.

“ Likewise juniper-berries were steeped in vinegar, and a handful of them mixed with bran was given twice a-day.

“ In places where the contagion had been extremely violent, the drink prescribed consisted of two handfuls of rhue infused in a pint of red wine; to which were added a few cloves of garlic, some juniper-berries, and two drams of camphire. A hornful of this was given every morning to each creature fasting; and by the use of all these means, two hundred and twenty-five bullocks and cows were preserved from all taint, though several of them had communication with the sick animals.

“ With regard to the treatment of these last, all bleeding was forbid; the fumigations were recommended; and as to the tumour which appeared on the tongue, it was thought better and surer to cut it entirely out with a bistort or scissars, than only to scrape and rub it. Scarifications were ordered to be made in the bottom and sides of the ulcer, and the whole tongue was afterwards fomented five or six times a day with tincture of myrrh and aloes, or with spirit of wine in which sal-ammoniac and camphire had been dissolved in the proportion of half an ounce of each to eight ounces of the spirit. A wash of theriacated vinegar, with some camphire added to it, is likewise very proper in this case; and it will not be at all amiss to make the creature swallow a spoonful or two of it every time it is used: for it cannot be thought that a distemper, of which the effects are so rapid and severe, that the tongue of the animals may be cut asunder by it and drop off in less than twenty-four hours, can be sufficiently treated by external remedies only. The following alexiteric medicines are therefore advised to be given inwardly.

“ Take roots of contrayerva and alecampane, of each three drams, a dry viper in powder, and one dram of camphire; mix them with a sufficient

quantity of the extract of juniper, make them into a ball, and give it to the animal.

“ Or, take of the root of swallow-wort, of master-wort, of alecampane, and of angelica, of each half an ounce; boil them in two pounds (or pints) of vinegar of roses till one third of it is evaporated. Strain off the liquor, and then add to it one ounce of orvietan: then divide it into two doses, and give one them in the morning fasting, and the other in the evening, taking care to cover the sick creatures well whilst they are taking the medicine. This done, there will be no need to fear returnus of the disorder, sometimes by so much the more fatal, as it afterwards appears on other parts, and in a different form: as experience has shown. It is moreover necessary that the diseased be perfectly cured, that both sound and sick be well curried, and that their mouths be examined several times a day to be assured of the situation the beast is in; for this gangrene does not show itself by any other external sign.”

The small-pox is, next to the plague, the most dangerous of all the contagious diseases to which sheep are liable. I shall here distinguish it only into the distinct and the confluent kinds. The distinct, or mild, stands very little in need of medicines: it may, and indeed should, be left to nature. The confluent, on the other hand, requires the greatest attention. Whatever the caule of this disease may be, look upon the expulsion of the matter, and the suppuration and drying of the pustules, as the natural progress of it. There must then be an eruption: but sometimes the eruption is imperfect, comes on with difficulty, or is even suppressed; and at other times is so great as to endanger the life of the animal. It therefore is plain that this disease should not always be treated in the same manner; for sometimes cordials may be requi-

site in order to support a too feeble eruption, and cooling medicines may be necessary to check a too-high inflammatory fever. If therefore, the fever appears high, blood must be taken from the jugular, and this must be repeated, because not above two or three ounces can be got from the jugular of a sheep at one time. This operation was found to give great relief to the sheep before spoken of at Beauvais. It sometimes lessens the number of pimples; but those which remain become larger, and suppurate more kindly. Two drams of salt-petre mixed with honey are given every day to each sick animal, and for drink warm water rendered gratefully acid with vinegar or spirit of vitriol; nor should the seton be forgotten here. If the pimples are of a violet or purple colour, they indicate a gangrene, or at least a disposition towards it. In this case, a dram of Peruvian bark, half a dram of sal-prunel, and eight grains of camphire, mixed up with honey, should be given two or three times a-day. Some sheep thus affected, and which had been given up as lost, were recovered by the use of these medicines. They must be kept within doors, especially in the winter.

If the sheep are weak, and the eruption feeble, not only bleeding should be avoided, but such medicines should be given as will incline the matter to the pores of the skin; such, for example, as a drain of vipers in powder in a decoction of contrayerva-root. A blister may be put on the neck after clearing it intirely of wool. This blister should be made of cantharides and a little vinegar mixed with leaven. It is commonly left on for a long while, because the flies do not easily affect the skin of sheep. One might even use from time to time a decoction of the sudorific woods; for the

common drink of the sheep in this condition should be water in which sea-salt has been dissolved.

When the pimples appear again, the eruption is kept up by giving every day half an ounce of flower of brimstone, with as much laurel-berries in powder, mixed with bran. This should be continued till the pimples begin to suppurate; after which the sulphur and laurel-berries should be suppressed, but their drink should still continue to be water rendered diuretic by the mixture of sea-salt. The discharge from the nose should be encouraged, by washing it with a decoction of tobacco, and blowing up the nostrils hellebore and betony in powder: for though a great discharge from the nose is a bad symptom, as it always indicates much putrefaction; yet a free discharge from thence is beneficial, just as a plentiful spitting is to mankind.

As soon as the pimples become dry, it is highly proper to purge the sheep with half an ounce of asafoetida in powder, mixed with bran, to prevent a translation of matter on the eyes or breast, which otherwise happens frequently.

In a village called Les Echerres, about three leagues from Lyons, one half of a flock of sheep was seized with the small-pox: the sound half was immediately separated from the infected; but though all communication between them was cut off, the disease broke out in some of those which had been deemed sound, and those infected ones were returned back to the sick. Endeavours were used to ward off the infection by properly fumigating the sheep-cotes, and clearing them of every ordure or other thing that could communicate or continue the infection.

Blisters were immediately applied to the inside of the thighs of most of the infected sheep; whether the small-pox was of the distinct or of the confluent kind; and in the others, instead of the blister, a feton was cut. The suppuration was soon esta-

blished by the one and the other of these means, and the effects which they produced were sensibly advantageous. The former of these creatures were not left wholly to nature; but she was assisted when necessary by decoctions of juniper-berries, or by decoctions of saffron in the proportion of a quarter of an ounce to a pound of water: and these remedies were given through a horn. In the confluent kind, recourse was had to the Peruvian bark, which is known to prevent and even to cure gangrenes. It is a medicine which promotes a favourable suppuration. Half an ounce of roots of swallow-wort was boiled in a pound of water; and in the strained liquor was put a dram of Peruvian bark in powder: it was then boiled up again, and the sediment was given with a horn every morning and evening: by way of precaution, ten grains of salt of wormwood were added to each draught, in order to give the more activity to the bark.

Camphire was tried on other sheep which had the confluent small-pox. Thirty grains of it were rubbed into the yolk of an egg, then mixed with a dose of the foregoing decoction, and given with a horn morning and evening.

When the disease fell on the eyes, the following collyrium was used.

'Take two handfuls of quince leaves, two drams of rind of pomegranate, one dram of seeds of sumach, infuse them for some hours in a pound of warm water, then give it a slight boiling, filtrate it, and, after having added to eight ounces of this decoction two grains of camphire and eight grains of saffron, foment the eyes of the creature with it.

Emollient glysters were given occasionally, and purges towards the close of the disease. This practice was attended with so much success, that out of

twenty-two sheep which were seized with the disorder, only one died.

M. Hastfer treats this disease in a manner very different from the above related. He attributes it to a too great quantity of humours, and prescribes only dry, sweating medicines, salt, lovage, rupatorium, some grains of civet, and all in a dry form: and, what is still more, he forbids giving any drink to the sheep whilst they are sick. This method may succeed in Sweden, a cold country, in which the perspiration is but little, the plants more watery, and the blood more serous: but surely such treatment would not answer in Languedoc, Provence, or any other warm climate, where the food is drier, and carries less moisture into the blood. Regard should always be had to the country and climate, in the treatment of every disorder, whether epidemic or other. The situation of Naples, bordering on the sea, in the neighbourhood of a vulcano, in a country which abounds with sulphur; that of Rome, in a champain country, washed by a river whose waters having but little descent, move slowly, are very different from that of Paris or Lyons, cities more inland, and in a colder climate. This difference in situation and climate must occasion a difference in the nature of diseases, and consequently should do the same in the method of treating them.

It is not less necessary to know how to guard against the contagious distempers of cattle, than it is to be acquainted with their natures, and a successful method of cure. To prevent a contagious distemper, the creatures exposed to it must be preserved from the influence of the cause, or the cause itself should be corrected. When the contagion is the effect of the constitution of the atmosphere, it is very difficult to preserve animals from its influence; for being continually exposed to its

immediate contact, they breathe it, it enters with the food into the stomach and intestines, it penetrates into the substance of the lungs, and in each of these places it communicates its noxious quality. It has, however, been found by experiment, that the constitution of the air may be changed for the better. We are told of what advantage the fires which Hippocrates ordered to be made were in the plague. Levinus Lemnius (*Lib. II. de occult. Nat. Mirac. cap. 10.*) says that the garrison of Tournai kept the plague off from that city by firing so many cannons and burning so much gun-powder that the air was totally changed thereby, and the city preserved from that dreadful scourge. In fact, nothing is fitter to correct the bad qualities of a putrid air than that excellent antiseptic, the sulphurous and nitrous acid set at liberty by the deflagration of gun-powder. It would therefore be adviseable to burn sulphur and nitre in the buildings where the animals are lodged, or to cause vinegar to be boiled in them till it is totally evaporated. Juniper-berries, myrrh, olibanum, assa-fœtida, may also be burnt in them; but these last fumigations should be used only in the winter, nor are they at any time so efficacious as the acids. The habitations of the cattle should be kept as clean as possible, their walls should be whitewashed, or washed with vinegar, the litter in them should be frequently renewed, their doors or windows on the north side should be opened, and those on the side from whence the infectious air proceeds, should be kept shut, as advised by Varro.

The bad effects of air may also be prevented as follows. If the constitution of the air tends to produce inflammatory diseases, it is proper to bleed the creatures exposed to it, to give them from time to time acidulated drinks, to prevent their being exposed to great heats, not to put them to

hard labour, to take care that they do not pass suddenly from a hot to a cold place, and that they do not drink too-cold water when they are heated. If, on the contrary, the constitution tends to produce putrid diseases, it would be proper to purge them with crocus metallorum, or assafoetida, or roots of briony, or with assarabacca, to give them acidulated antiseptic drinks, and to rub them often, as well to free them from infectious particles which may adhere to the hair, and penetrate the skin, as to increase the perspiration; for it is not to be conceived how many disorders arise from a suppression of perspiration, and how salutary it is to keep the perspiration clear.

When the contagious diseases of animals arise from the bad quality of their food, it is certainly in our power, in a great measure, to prevent them. All plants prejudicial to the health of cattle should be rooted out of every pasture; which is easily done with a spade, when the plants are in bloom; for if they are then cut through beneath the surface of the ground, and the clod is again replaced, the remaining root will perish, and thus the whole pasture may in time be cleared of them. Artificial grasses may be sown instead of the natural. The world is now acquainted with the benefits which arise from such grasses, both in regard to their quantity and their quality. Lucerne, sainfoin, and clover, are known to be very wholesome and very nourishing. As they grow to a pretty good height, the effects of a mildew or blight may be prevented in them, which cannot be done in plants that creep along the surface of the ground. Thus it is a common practice, when corn is mildewed, for two men, holding each of them the end of a rope, and being as far asunder as the length of the rope will permit, to run along the fields of corn: the rope either shakes off the vermin which occasion the

blight, or makes the mildew fall off by the shaking of the corn, which afterwards recovers itself. If this method does not prove effectual when used on artificial grasses, the owner should not hesitate to cut down the pasture, burn what is infected, and endeavour to procure a fresh healthy growth. At all events, cattle should not be suffered to feed on infected grass of any kind, nor even in the field where that grass was, till a new growth has arisen.

Cattle should not be suffered to drink putrid standing water, especially in an infected season: for, as was before observed, the water which was exposed to the air during the plague of London, became covered with a blue pellicle, which mixed with bread and given to a dog, made the creature die mad. Such a pellicle may adhere to all standing waters, and will be more or less dangerous, according as the air is more or less infected, and the water is more or less loaded with putrid substances.

As water is an indispensably necessary article of food, every bad quality in it is the more dangerous, and the means of correcting them are the more requisite and valuable. In order to attain this desirable end, a very simple, easy method was tried before the laudable Society for the Encouragement of the Arts, &c. at London, with the wished-for success. It was found that clay, mixed in putrid water, to such a degree as to take off the transparency of the water, so that a hand held under its surface, could not be seen through it, soon settles to the bottom if suffered to stand still, and carries down with it all such vegetable or animal putrid substances as are mixed with the water. These substances, kept asunder, and buried as it were in the clay, cease to putrify, and the water remains perfectly clear for a long time. It is almost needless to observe, that if there are any living insects in the water, they should be separated from it, by

running the water through something which shall keep back those insects, or their brood, which may be too bulky to be carried down and buried in the clay. If the putrefaction be great before these means are used, a disagreeable stench may still attend the water, though it appear clear. The Rev. Dr. Hales, that friend of mankind, has taught us to get rid of this by ventilating the water, that is, by forcing through it air, which carries off the remaining putrid taint. If any object to the trouble of preparing in this manner a sufficiency of water for a whole herd of cattle; all the answer that such deserve is, that if they think the health of men and of beasts not worth this trouble, it is in their power, they and their cattle, to crawl slowly, but certainly, to the grave. Even amongst mankind, many of the usual autumnal epidemic diseases might be prevented by this easy method: for the bad water which is drank at that season gives rise to many disorders in the bowels, as well as to fevers of various kinds.

If clay cannot be had, it is adviseable to shake the water well, or have it tossed about by oars, before it is given as drink. Thus it is that people on board of ship render their corrupted water less unhealthy by beating it; by which means the impurities in it fall to the bottom of the casks. Mr. Boyle having taken some water which had gone a long voyage, beat it frequently; by which means all its impurities subsided, and it became perfectly pure and wholesome. Where sweet water is wanting, a well should be dug.

If a contagious disease has unhappily seized a herd or flock, every means possible should be used to prevent its spreading. The first care to be taken is, to cut off all communication between the sound and sick. Cattle collect the grass with their tongue before they bite it; by that means some of

their saliva necessarily adheres to the grass which remains, and if they are distempered, the grass is of course infected; and other cattle which feed on it catch the contagion. Again, cattle are fond of licking one another; and as their tongues are rough, there sticks to them a great deal of hair, which afterwards forms in their stomachs balls called *egagropiles*, which incommode them much when they become of a considerable size: but this is not yet the greatest evil. The perspiration is vitiated in infected animals, and their hair falls off easily: the infection adhering to the hair thus licked off by a sound animal, becomes an infection to this last, and thus it may be spread to many. The herds should therefore be frequently visited, in order that every creature of which there is the least suspicion may be separated from the sound, which last must no longer feed on the same pasture, nor drink of the same water with the former: even the cribs, trays, tubs, or any other thing made use of for the sick, must not be brought near the sound, at least till they have been washed well with lime-water or vinegar, and afterwards fumigated. The persons who attend the sick cattle should not approach the sound ones before they have washed themselves, and changed their garments, which, in this case, should be of flax or hemp, and not of woollen; because wool imbibes the contagion, retains it, and readily communicates it.

On the above principle it was that Lancisi proposed to a congregation of Cardinals, during the afore-mentioned plague which made such havock in Italy, to kill not only all the cattle that were manifestly infected, but even all those that there was but the least room to suspect of being infected. This advice was rejected after a long debate, and it was too soon experienced how much wiser and more prudent it would have been to follow it. A

proof of this soon resulted from the town of Capravola. Five bullocks there were suddenly seized with the distemper; and after immediate strict inquiry it was found, that a strange bullock had been introduced into the inclosure where all the cattle belonging to the town were kept. The infected bullocks were immediately killed, and the distemper ended there.

All those who took sufficient care to prevent the entrance of any infected creature into their lands, not only about Rome and the ecclesiastical state, but also in the territories of other princes, preserved their cattle. Such was the effect of the vigilance of the princes Pamphili and Borghese, that, though at the very gates of Rome, and in the province the most infected, all their cattle escaped unhurt. The same care preserved the fields of Corneto, of the patrimony of St. Peter, of Umbria, of Picenum, of the Flaminian province, of Tuscany, and of Modena: and it is likewise by the same means that the convents of nuns are generally preserved from the plague, when it unhappily attacks mankind (a). By a similar care the Temple was preserved from the plague, when it made such havock in London in 1666.

Too much care cannot be taken that the bodies of creatures which have died of contagious diseases be buried deep, especially in warm and moist countries; not only to prevent carnivorous animals from being infected, which may soon spread the contagion, but also to avoid increasing the putrid exhalations with which the air is already too much loaded. They were very near being fatal to the French in Minorca. That island being a rock covered with very little earth, it was not possible

(a) See *Lancisi Opera, Tom. II. Gen. 1713. Dissert. Hist. de Bovillâ peste.*

to bury the bullocks which died; they were thrown into the harbour, with heavy weights tied to them: but notwithstanding this precaution, the bodies soon rose up and floated on the surface of the water, which is constantly the case as soon as an incipient putrefaction sets the fixed air in the animals at liberty, and the bodies become specifically lighter than the water. These bullocks infected the air of the port with a horrible stench, which rendered sick many of the seamen who remained on board of the ships; and though the carcases were towed out into the open sea, yet as the current brought them frequently back, it was found that the only safe way was to burn them.

Reflecting men observed, with much concern, that, during the contagious distemper which prevailed from 1740 to 1750, the country people, in France in particular, took very little care to prevent the spreading of the contagion. They skinned their dead cattle, and kept the skins; an œconomy fatal to the surviving cattle, and ruinous to their owners. None should be permitted to keep such skins, unless they are immediately put into lime-water, and steeped in it for some time. The dung of diseased cattle does not require less attention, because the infection is quickly communicated by it when it is left exposed to the air. Every particle belonging to infected creatures should therefore be immediately burnt, or buried very deep.

When one is obliged to make use of a building in which creatures infected had formerly been, too much care cannot be taken to clean the floor, walls, roof, and every other thing belonging to it, and also to sweeten the air: for it has been observed, that healthy creatures have been seized with contagious diseases by being put into buildings in which infected animals had been, even though those

buildings had not been used for a considerable time. Trincavel relates (*Lib. III. Consil. 17.*) that ropes, which had been made use of to carry out dead bodies in time of a plague, being taken out of a trunk in which they had been lain twenty years, by a servant, he and ten thousand more died of the plague. Sennert (*Tom. II. p. 150*) mentions a plague at Breslau, which was communicated in 1553, by linen that had been locked up ever since 1542. Since then the contagious virus will remain so long dormant, and yet retain all its strength, too much care surely cannot be taken to purify the buildings into which cattle are to be put. It is not enough to clean them and keep the doors and windows open: every part of them should be well washed with lime water or vinegar, fumigations should be burnt in them, and vinegar, or spirit of nitre, should be boiled in them till totally evaporated.

By strictly attending to the above precautions, we may hope to prevent many contagious distempers, to hinder their spreading, and even to cure, by means of the few medicines here mentioned, considerable numbers of infected cattle.

Additional Observations on the Diseases of Cattle, and on their Cures; by the Royal Society of Agriculture at Paris.

TOWARDS the end of the year 1762, a formidable disease attacked the cattle in the parish of Mezieux, in the province of Dauphiny. The bullocks and cows were chiefly affected by it: but few horses or mules felt it.

During the first twenty fours hours the following symptoms appeared. A refusal of all kinds of

food whether solid or even liquid, a heaviness of the head, hanging of the ears, watery eyes, rough and dull-looking hair, a costiveness not to be got the better of, a painful swelling about the lower jaw and along the neck, a pulse rather dull than frequent, a discharge of a frothy humour from the mouth and nose of some. These symptoms continued for two, three, or four days, at the end of which a great beating in the loins, and the feebleness of the sick creature, foretold a speedy and inevitable death.

The farriers and country people bled them in the ears, gave them cordials, and administered drinks with a view to purging, but which contained nothing capable of producing that effect. At length the progress and ravages made by the disease determined the unhappy husbandman, on the point of being ruined, to apply elsewhere for the help of which he felt how much he stood in need. More intelligent persons sought in the dead bodies of the animals, that which the ignorant and uninformed could not discover in them. A beginning of putrefaction showed itself, by livid spots, in the hind part of the mouth, in all the muscles of the pharynx and larynx (the gullet and windpipe) in the cellular membrane which surrounds them, in the whole passage of the æsophagus, and in the trachea arteria. In some bodies the cawl was affected, in some others the intestines. In these last the spleen was greatly swelled; in the former, neither the liver nor the lungs were in a natural state, and in all, the digestion was depraved, as it usually is in all dangerous diseases; for the paunch was filled with the food they had taken down before the disorder had openly appeared in them. The red, and sometimes brown or even black colour, the swelling, the soft consistence of the parts about the throat in the greater number of the dead, were the

consequences of a violent inflammation, not of the crisipelas or phlegmon-boil kind, for these would have excited a greater degree of fever, and would have showed themselves with a more remarkable pain and hardness; but of a latent inflammation, and a swelling caused by the want of action in the parts; such, in short, as is found in malignant diseases. A similar disorder happened at the same time in the town of Macon, where a gangrenous quinsey carried off rapidly a prodigious number of people. This swelling frequently extended itself to all the glands of the lower jaw and about the neck and chest; thereby forming considerable tumours on the outside, which in many creatures came to suppuration either naturally or by the help of art. In some, the throat was not so dangerously affected; but tumours appeared in all parts of the body indiscriminately. These were not the less looked upon as critical deposits, and accidents which attended a disease owing to the same cause, and of the same character. In effect, the same treatment, except so far as the different deposits required a particular method of cure, preserving the lives of fifty-three out of sixty-two; whilst out of forty-nine which were treated in the common way, not one escaped.

The summer had been very hot, and the drought very great. The only pastures to which the cattle could be led were bordering on a pond full of muddy, standing, putrid water. The place nearest to this was a dry gravel, heated by the scorching sun, and consequently a truly burning abode for the cattle, which were there most part of the day. Thus the excessive heat of the season, the indifference of the pasture, and chiefly the bad qualities of the water, were the first causes of this disease: for all the juices being heated and rarefied, there was necessarily a great loss of the most fluid and

subtile parts of the blood, and the corrupted state of their food gave the disorder a putrid turn. The hind part of the mouth, the larynx and pharynx affording a continual passage to very hot air, and the mucus which should naturally moisten them being less, owing to the blood's being deprived of it, or to the excretory ducts being dried up, the whole became very susceptible of inflammation. Add to this the bad qualities of their food, and we shall not wonder that the inflammation degenerated into a quinsey truly gangrenous.

What in all similar fatal cases should be first attended to, became here the first object of our care. All communication was cut off between the sound and the sick: for the surest way to avoid the plague is to fly from it. The cattle which had hitherto escaped were therefore taken out of the infected houses, after having been strongly rubbed with wisps of straw previously fumigated with thyme, rosemary, sage, and other aromatic plants, on which a small quantity of vinegar was cast while they were burning. The buildings into which they were put were cleaned of whatever dung was in them, and fumigated with juniper and bay-berries bruised and steeped in wine-vinegar and burnt on live coals: others were fumigated with only the fumes of vinegar. The diseased cattle were afterwards carefully confined within the limits in which the disorder unhappily reigned; thereby to prevent its spreading. The same precautions that were taken with regard to the sound cattle, were extended to all in general, to the extent of the boundaries of the village: all were bled again in the jugular vein, and by means of that evacuation, by rendering all their drink lightly acidulated, by diminishing the quantity of their food, by not sending them too soon to grass, by not suffering them to remain too long in the heat, and not to

be out at all in the night ; and lastly, by giving them sweet water to drink, above three hundred bullocks and cows were entirely preserved from this infection, which never went beyond the limits first set to it.

The sound cattle being thus taken care of, the infected were treated as follow: the buildings were cleaned and fumigated with the same care as for the others; the necessity of renewing the air became indispensable. The buildings were in general very injudiciously constructed, low and not airy. The constant respiration and perspiration of the animals that were in them soon deprived the air of its vivifying principle, and those animal particles soon putrescied. From both these causes, the original tendency to putrefaction was much accelerated. Lofty buildings were therefore prepared for the sick, and they were kept well aired by windows which admitted a constant supply of fresh air at the same time that they carried off the bad.

The inexpressible advantages arising to mankind from that attention which the Rev. Dr. Hales excited to the preserving of the air sweet, especially where there are sick, or numbers assembled together, calls upon us in this place to pay him that tribute of praise which his unbounded beneficence deserves. A window in each end of such buildings, and as near to the roof as can be, is, in this case, very useful; because the one admits fresh air, while the other discharges the noxious air; and this without cooling or altering the temperature of the air near the sick.

Many of these sick cattle were bled in the jugular; but that was only once, and in the very beginning of the disorder. Care was taken not to perform this operation after the signs of putrefaction had appeared. Water whitened with bran was their only nourishment. An ounce of crystal

mineral was added to a pailful of this water, for some; and for others the water was acidulated with vinegar, which was preferred to every other acid. Cooling glysters were not forgotten. Two of them were given daily to each of the sick animals. They were composed of leaves of mallows, of pellitory of the wall, and of mercury, of each two handfuls, boiled in five pounds of common water to a consumption of one fourth. Two ounces of common honey, as much oil of olives, and one ounce of crystal mineral were added to this when strained off.

Injections were also thrown up the mouth and nose two or three times a-day. These were composed of the leaves of plantain, briar and agrimony, of each a handful, boiled half an hour in four pounds of common water, to which were added, when strained off, two drams of sal-ammoniac; and sometimes in place of this salt, two ounces of oxymel squills were mixed with this liquor. The liquor thrown by a large syringe into the nose, descended into the back part of the mouth, and moistened and washed all its parts. It was the more necessary that these parts should be well cleaned, because they generally were the parts most affected. The creatures were likewise from time to time made to snuff up the volatile spirit of sal-ammoniac, and doubtless the volatile fumes penetrating into the live parts, stimulated them, and excited in them a motion, by the help of which the diseased parts exfoliated or cast off in white filaments.

The tumours which appeared externally were suppurated as speedily as possible. The ripening poultice or cataplasm used for this purpose was made of leaven with one third of basilicon. When this was thought insufficient, another was substituted in its place, made with six bulbs of lilies roasted under the ashes of a wood fire, four ounces

of white lily roots, and four handfuls of sorrel boiled in four pounds of common water, and afterwards bruised in a mortar. Two ounces of hog's lard, and a like quantity of common honey, old grease and basilicon were mixed with them; and lastly, according to the circumstances, half an ounce of galbanum dissolved in wine, and an equal quantity of gum ammoniac in powder were added. As soon as a fluctuation was felt in these tumours, they were opened with a knife or caustic, but most frequently with the actual cautery, to excite a more plentiful suppuration by giving the greater stimulus to the vessels. If it was not possible to open all the tumours externally, one or two glysters were immediately injected, in order to prepare the way for a purging drench, lest the matter being absorbed into the blood, might add to the already too-putrid disposition of the blood. The purging potion was composed of an ounce of the leaves of tenna infused for three hours in a pound of boiling water; and in this liquor, when strained off, an ounce of bruised succotrine aloes was infused all night over hot ashes, and given to the animal warm in the morning out of a horn. This was repeated as occasion required, till the symptoms disappeared: and then the creatures were gradually brought back to their usual wholesome food.

One of the diseases which made the greatest havock, was that which, in the year 1763, left scarcely any cattle alive in the district of Brouage in the election of Marennes, in the generality of Rochelle. The accurate account given of it by M. Nicolau, M. D. on the eleventh of September, 1763, is so full of instruction, that it ought not to be omitted here.

“ The parishes in which the distemper among the cattle exert its greatest fury, are situated on the borders of a low country, in extent about three

leagues. It was formerly laid out in salt-pits; but the communication with the sea has been since cut off, and the sea now comes no farther than the town of Brouage. The whole remains in the uneven state it was in when employed for making salt; and the hollows and risings still retain all the appellations then given them. Some of the hollows have been in time imperfectly filled up, and others remain in nearly their former state. They are filled with water in rainy seasons, especially during the winter; and the water, not having any outlet, stagnates till the sun and heat of the summer have evaporated it. The deepest, which seldom dry intirely, form so many pools full of aquatic plants, and, notwithstanding that, are made to serve as watering places for the cattle. The whole forms a vast slimy, marshy meadow, in which are fed numbers of cattle intended for the butcher, and for the farmer's work. It is the loss of these which has in part occasioned the misery of the inhabitants of that place.

" These receptacles of mire spread far around foetid exhalations which infect the atmosphere, and render the inhabitants subject to intermitting putrid malignant fevers towards the end of the summer. The disagreeable smell is particularly felt at sun-rise in good weather.

" During the spring and summer of this year, 1763, the rains have been almost incessant, and the weather constantly cool. In the greatest heat, Reaumur's thermometer, in a room facing the north, did not exceed 18 or 19 degrees (from 64 to 68 of Fahrenheit's). On the 3d of July we had a storm, accompanied with hail of an uncommon size, which in many places destroyed every kind of crop, and did considerable damage to the buildings. Most of the large cattle which the disease has carried off were exposed to this storm, and felt all its

violence; but the sheep and swine, to whom the distemper proves equally fatal, were under shelter. Besides, the mortality had begun before.

“ There was great plenty of grass, owing to the constant rains; but these have prevented its being made into hay. Great part of it perished without being cut, or rotted after it was cut. The cattle were exposed night and day to the inclemency of the season. All the fruits both of the summer and the autumn have failed, and the trees are now (Sept. the 11th) in bloom, as in the spring.

“ The grafts which grew in this place did not appear to me to be unwholesome for cattle; and even if there were any such, the principal cause of the contagion ought not to be imputed to them, since the sheep which fed elsewhere, and some horses which lived on dry hay, were equally affected, as well as the swine which did not feed on it.

“ The mortality spreads to the other domestic animals, without excepting even the poultry*, which perished in a hamlet of St. Symphorian. Yet, however epidemic the disorder is, there is room to think it not contagious. Numbers of dogs died in several parishes, which had eaten of the flesh of the diseased cattle; but others which had not eaten of it died likewise, and some continued to eat daily of it without being incommoded.

“ In the month of May last (viz. in 1763) some complaints appeared on the tongues of the horned cattle in a few contiguous parishes; but that was

* The Royal Society of Paris observe here, that the distemper of which the poultry died in the above-mentioned village, may perhaps not have been the same as that which killed the cattle, nor produced by the same causes; for that the mortality amongst fowls was pretty general every where, and seemed to have been the consequence of a great inflammation on the breast, like that which affected the dogs.

only a false alarm, for the complaints went off without doing any mischief. In June, and in the beginning of July, the reigning distemper showed itself among the sheep, and has committed such havock as not to leave one of them in some places; and in others, the few that do remain are abandoned by their shepherds and left to die, literally speaking, like rotten sheep, without any care being taken of them.

"The mortality among the horned cattle, horses and other animals, has been fatal principally to two parishes since the end of July. It now spreads on all sides, though with less havock in some places than in others.

"The first symptoms observed in them was their abstaining from food. I do not mean to say, that no other symptoms precede this; but the keepers of the herds, little experienced in, and as little attentive to, such objects, do not distinguish them. This prelude awakens attention. The creatures are observed to be melancholy, to hang their heads, to have cold and drooping ears, rough hair without its usual lustre, loins fallen and beating, the belly hard and full, the whole body wretched and seeming to be disposed to make efforts to urine. The urine which they void is often as clear as water; it is seldom that any thing passes by stool, and chewing of the cud ceases in the horned cattle. In a few hours after, if no tumours appear on the surface of the body, they are seized with a shivering, their eyes become dull and watery, a tough snivel issues from the mouth and nose, they lie down and die quietly, or are more or less convulsed. In this extremity they stretch their heads out frequently, pant for breath, fetch long sighs, and sometimes too they cough. These symptoms often come on so rapidly, that the creature dies before they have been seen: many bullocks have

dropt down dead under the yoke. The quicker the succession of these symptoms is, the greater is the danger. A violent shivering is always fatal. When the symptoms come on more gradually, there commonly is no shivering, but if there be, the danger is in proportion to its violence and duration. It sometimes happens that tumours appear indifferently in all parts of the surface of the body. They sometimes remain fixed in the part where they first appeared; at other times they disappear, to show themselves elsewhere; if they vanish entirely, the creature dies; if, on the contrary, they increase in number, and on the parts least essential to life, whilst the creature still retains its strength, there is room to hope for a recovery. Daily experience begins to prove, that the cure depends essentially on the character of these tumours as approaching the nearest to a phiegmon, and on their good issue.

“ The tumours are not of the inflammatory kind. They seem first of all to affect the muscles. The part affected feels hard, without being much swelled. Soon after a humour insinuates itself into the cellular membrane around, which relaxes the fibres steeped in it, enervates them, and raises a lump in the skin. If it is not immediately discharged by an opening, its stay produces a gangrene which soon spreads farther; or if the humour falls on any of the bowels necessary to life, the creature dies before the gangrene has made much progress. These tumours are flabby, and yield only a thin, reddish saries. If a suppuration comes on, all does well, the creature recovers strength, and appetite to eat. If, on the contrary, there is only a thin discharge without suppuration, the cure goes on but slowly, the creature languishes and sinks, till by the falling off of all the gangrened sloughs, the wound appears

well coloured, and the cattle themselves lick it with their tongues in order to heal it.

" The gangrene which succeeds this tumour is of a very particular kind. The cellular membrane and the flesh seem to be rather macerated than rotten. They look of a pale colour, inclined to livid; and though their fibres seem disuniting, they retain a pretty firm consistence: but the slough which casts off before the cure, is black, foetid, and quite mortified. If the tumours continue long in a lax flaccid state, there is great danger of the matter's being reassumed into the blood, and consequently of its falling the more violently on some other part. This happened to several creatures of different kinds. They died, either because the discharge was interrupted, or because it came out but imperfectly. The more sensible the diseased flesh is, the greater is the room to hope for a cure; and the more insensible it is, the greater is the danger.

" When the tumours, from being flat, as they are at first, rise higher into a round circumscribed form, becoming at the same time more firm and elastic, it is a sure sign that nature is getting the better of the disease, by changing that thin discharge into a tumour of the inflammatory kind; which being in a convenient place, always ends well. The weakness and faintness soon change for the better when these favourable signs appear. The flies of every kind, which, attracted by the smell of the sickness, settle on diseased creatures in greater numbers in proportion to their weakness and inability to shake them off, leave them likewise in proportion as their strength returns. A liveliness and desire of eating succeed their former dull state.

" The humour contained in these tumours, shows itself sometimes from the very beginning to

be of great acrimony, almost caustic. M. Drouhet, surgeon at Point l'Abbé, has observed, that having opened one of these tumours on the inner and upper part of the thigh of a bullock, the humour discharged from it stripped off the hair in twenty-four hours, as if the part had been steeped in boiling water. The bare skin appeared very red and inflamed. The tumours which show themselves on the breast of a horse are the most dangerous; and on the contrary those which are formed in the part corresponding to that which is called the dew-lap in a bullock, are the least dangerous. Those which come in the muzzle, mouth, or fundament of any creature, prognosticate the worst of events. It is in this last case in particular, that the creature, either whilst dying or when dead, bleeds at the mouth, or nose, or fundament, and sometimes at all of these together.

“ One of the symptoms most commonly met with on the opening the dead bodies, is a want of digestion. The whole intestinal canal is generally empty, while the stomachs are full, and as it were crammed with grass, which is more or less hard in the third stomach of animals which chew the cud. This happens though they have ceased to eat for several days before their death; and even when a sudden death takes them off before they have discontinued to eat.

“ The blood taken from the sick creatures coagulates readily, and is soon covered with a thick hard crust, of a whitish colour, a little inclining to yellow. Bleeding, when properly timed, has had sensibly good effects; but when done at an improper time, the consequences have always been fatal. Most of the drenches hitherto given have seemed to hasten death, according to the report of those who have made the greatest use of them.

" Though the causes of epidemic diseases are seldom known, yet I think we may impute the disorder here spoken of to the too long continued moisture of the air, owing to constant rains, fogs, and storms, which have not ceased during the whole of this year (1763). To this may be added, that the moisture, which had penetrated deep into the earth, may, rising again, have spread in the air uncommon exhalations, which may likewise have greatly affected the animal œconomy. But as disquisitions of this kind lead little to the cure, I shall not dwell any longer on them.

" This epidemic disease has so great a resemblance with what we call in man, a putrid malignant, purple and pestilential fever, that I do not scruple to give it the same names in other animals. So much is it of the same stamp, that I met with three men in the country, on whom the anthrax or true pestilential bubo had appeared; probably owing to their being so much among the infected cattle. Though, for want of judicious observers among those who watch over the brute creation, we have not a regular account of the first symptoms by which the approach of the disease might be determined; yet, from the symptoms above-mentioned, there were evident signs of an inflammation in the beginning, as will appear to every intelligent reader, from the recapitulation of them here made. The violence of the fever, and the concomitant putrid disposition of the air, and also of the infection communicated, soon brought on a putrid state of all the fluids, as appears no less evidently from the symptoms already mentioned.

" During the course of my inquiries, I found but one peasant who could give any account of the pulse. This man, examining whether any tumour yet remained in a cow, put his hand between the upper part of the fore-leg and the breast, and felt

a frequent and strong pulsation of the artery, which answers to the axillary in men. The animal was then feeding; but it soon lost all desire to eat, was thereupon judged to be distempered, and died speedily after.

“ The pulsation of the arteries is easily felt in most cattle, and particularly that of the temporal, the axillary, and the crural. The carotid artery in a horse is frequently perceptible by the eye, in that part where the neck joins to the breast; and the artery may likewise be felt in that part of the leg of a horse which answers to the ankle in man; and the crural artery is easily felt in sheep.

“ The excellent Dr. Hales, who let no inquiry escape him which he thought might be of use, has given, in his *Hæmostatics*, the number of pulsations which the arteries of different animals make in a minute. He counted forty-two in a minute in a horse full grown and at rest; sixty-five in a very young colt; fifty-five in a colt three years old; forty-eight in a horse five years old, but a native of Limoges, and consequently of a country where these animals are very backward; thirty-two in an old horse; and fifty-five, sixty, and even up to an hundred in a horse whose crural artery was cut on purpose for instruction. The pulse was more frequent as the horse approached its end. In full grown mares he counted from thirty-four to thirty-six; which proves that the pulse is less frequent in the females than in the males, in brutes*. The arteries of bullocks and cows beat nearly the same as those of horses and mares. In sheep, they beat about sixty times in a minute; in dogs, about ninety-seven times. It is, however, to be observed, that the pulse is far from being uniformly the same in each species, nor even

* This observation may be true with regard to brutes, but we think it is otherwise in women.

in the same animal, at all times; the frequency of pulsation frequently depending on many circumstances, such as rest, food, as well as the degree of health. The frequency of the pulse in the different species of animals may be said to be in proportion to their size, slowest in the largest animals, and quicker as they become less.

" In the beginning of the diseases, the advice judiciously given by the Royal Veterinarian School at Lyons, should be allowed. Bleeding, a spare diet, acidulated and nitrous drinks, and emollient loosening glysters, will be of great service. These means may mitigate the symptoms, check the progress of the disorder, and thereby procure time to place proper remedies fit to prevent that feebleness and great degree of putrefaction which are so much to be feared. The use of the former medicines is therefore to be followed, by giving liquors which stimulate, and yet are not too acrid; and by administering cordials and such medicines as prevent the gangrenous disposition. Emetics and purgatives are, in this case, given to men; but the structure of the stomachs of cattle render the use of vomits impossible with them; and they are so hard to move by purgatives, that these become dangerous from their stimulating too much. Other animals whose stomachs will admit of vomiting, such as dogs and swine, have been cured with the help of vomits.

" The putrid and acrid quality of the humours which are contained in the tumours, requires their being opened as soon and as fast as they appear, be they ever so many. The longer the opening is delayed, the more the humours are corrupted. It is likewise right to draw the humour to places the least dangerous, by applying cauteries, or making setons in them, though there is not any humour in them. The parts should at the same time be

strengthened by fomentations, such as a decoction of scordium, made in wine and sharpened by the addition of sea-salt, or sal-ammoniac. The wound should be dressed with a suppurating medicine, covered over with some plant more or less acrid, according as it seems necessary to promote a greater flow of humours, or only favour the discharge of them. Lousewort, black hellebore, root of iris, &c. answer this purpose. When the wound becomes clear, it requires no other dressing than lint and a proper digestive or turpentine.

“ By means of this easy and plain method, people, little accustomed to the care of cattle, have preserved the lives of many; and it is to be lamented, that we have not in our country places more expert farriers, capable of carrying on a regular method: for by that still more might be saved.

“ The cattle never appeared fatter nor in better condition than they are this year (1763); and the disease has seemed chiefly to attack the finest and plumpest: no wonder that their owners are grieved to see them die.”

M. Nicolau next gives an account of what was observed in the dead bodies.

“ On the 23d of August, 1763, a bullock died at about four o'clock in the afternoon, after having been slightly convulsed. His body was not swelled, nor did the disease appear by any external mark. Being opened immediately after death, the flesh appeared sound, without any offensive smell. After having cut the sternum and pleura, a small quantity of wind escaped, not at all foetid; and the mediastinum, pleura, diaphragm, heart and lungs, were in their natural state. When these viscera were removed, some blood was spilt, which was not coagulated, but in a dissolved state. The lungs had some hydatides on the surface, filled with a thin serum. Otherwise nothing extraordi-

nary appeared either externally or internally. The tongue, mouth, and æsophagus appeared sound. In the abdomen, the cawl was sound. The spleen had some gangrenous spots upon the part which touches the stomach. The bile was thin, and of a somewhat paler colour than is natural. The stomach and intestines having been torn, through the unskillfulness of the farrier, it was not possible to examine them with sufficient exactness. However, the abomasus appeared entirely sphacelated, and the villous membrane fell off so easily, that parts of it were mixed with the food, and others lay upon it.

" A cow was observed to be sick on the 22d of August, and in the evening of the 23d we were informed that she was dying. As we were going towards her, in order to examine her, she mounted very quickly upon a high heap of dung, where she fell, and died in violent convulsions at about seven in the evening, emitting a thick slimy matter from her mouth and nose. We opened her at eight in the morning of the 24th. Her belly was swelled, owing partly to her being big with young, and partly to wind contained in the peritoneum. No foetid smell came from her, nor did any thing uncommon appear on the surface of her body.

" The skin being cut off, the cellular membrane appeared sound. The milk which issued from her udder was white, of a due consistence, and clear. The head and breast were in their natural state; but the blood, which flowed plentifully from the large vessels, was in a dissolved state, no where coagulated. A small quantity of wind, not stinking, issued from the breast and belly. The stomachs were distended; and all of them were full of græs, except the abomasus, which contained a small quantity of a muddy dark-coloured liquor. In general, the græs contained in the other stomachs was not so dry nor so much chewed as in the bullock; yet it seemed sufficiently so to render the

digestion extremely difficult. All the stomachs were deprived of the wrinkled membrane which covers their inside. This membrane lay upon the food, and was partly mixed with it. Also several parts of the coat of the third stomach were destroyed, looked black and fell in rags on the least touch. The intestines were quite empty and inflamed, as was also the mesentery. The intestines were likewise deprived of their inner villous coat, and in many places so sphacelated, that they fell to pieces on the least touch. Part of the cawl was in the same state, whilst the rest of it appeared sound. The bladder, the womb, the foetus, and its covering, and all the rest of the flesh looked well, and had no bad smell; and what is remarkable, the corrupted parts had not a very bad smell.

“ On the 28th and 29th of August, a horse was observed to be sick. The first thing that appeared was a tumour on the left side of the breast, from whence it soon extended over all the lower part of the neck. A farrier, in my presence, destroyed the skin to the flesh with a red-hot iron. The horse showed no sign of feeling this operation; though he was at the same time sensible of the bites of flies in other parts of his body. There was no discharge from the wound, and he died at about five in the afternoon of the 31st. We opened him early the next morning. He stunk, and his belly was swelled. On the opening, a quantity of very stinking air issued out: all the bowels were in their natural state, excepting some traces of inflammation. The stomach only was full of hay, though the creature had not eaten for three days before his death. The intestines were empty. The pericardium contained a great quantity of lymph a little bloody, in which the heart seemed drowned; its basis was drenched, loose, and as if macerated in it. All the fore-part of the neck from the breast to the jaw, that is to say, all the

tumour, appeared under the skin to be only a mass of fibres, some white, others livid, all macerated and drenched in a mucilaginous lymph, resembling a discharge from the nose, a little tinged with blood. The flesh all around was likewise very moist and livid; but elsewhere it was sound.

“ A sheep, yet warm, was found on the 2d of September. The skin between the legs, where it is not covered with wool, was speckled with red and purple spots. There was under its throat, between the two branches of the lower jaw, a tumour bigger than one’s fist; and, upon opening it, there issued out a great deal of tawney serum, with which all the cellular membrane around, under the skin and between the muscles, was filled. It reached as far as the base of the brain, which was likewise steeped in it. There appeared no sign of gangrene elsewhere. The rest of the body was found, both within and without, excepting that the intestines were empty. The three last stomachs were not too full; but the omasus, or first stomach, contained a great deal of grass. The liver had in it some old schirruses, which seemed not to have any relation with the disease of which the creature died. The gall-bladder was of its natural colour, as well as the bile. The spleen was swelled, and stuffed with black blood.

“ On the 7th of September, we examined six dead sheep. The five first had no other symptom on the external parts of their bodies, than purple spots on the places free from wool. The sixth had many more; besides which, it discharged blood from the nose and fundament; which last was swelled all round. We opened this sheep. The head and all the rest of the body were found and free from inflammation. The first stomach, called *omasus*, was distended, and stuffed with grass; the second stomach contained less of it in proportion; the third stomach had but little in it, and that

somewhat hardened ; the fourth contained a muddy liquor of a dark green colour; its coats were red, and its wrinkles a little gangrened. The intestines contained excrements, the cellular membrane around the anus was full of serum, and the veins were filled with clotted blood."

Dr. Nicolau's above-recited account of the distemper having been presented to the Veterinarian School, this highly useful Society give accordingly their opinions thereon to the following effect, and the Royal Society of Paris have published it, in order to afford every help in their power in so great a calamity, in case the like should happen again.

In this consultation, they agree with Dr. Nicolau as to the causes of the disease, and are of opinion, that it consists in a perversion of all the humours, and in a relaxation, inaction, and stupor of the solids.

" As to the tumours which appeared externally, they should, say they, with manifest reason, certainly be looked upon as a salutary crisis; especially when there yet remained strength enough in the solids, to throw the vitiated humours on the part where the obstruction had begun, and by that means so far free the rest of the mass of blood.

" Even the sound cattle in so unwholesome a country as the district of Brouage, above described, carry in them the seeds of the disorder, and therefore the first attention should be directed to their preservation. As to correcting the bad qualities of the air and water, enough has been already said on that head, as well as of purifying the places into which the sound cattle are to be put. Particular care should be taken that their food be wholesome; and if it be dear, it may be given in less quantity: for it is better that the cattle become lean, than that they die. Running water should be got for them, if possible: but if they think standing water, vinegar should be mixed with it, or red-hot irons may be quenched in it. It should,

If possible, be boiled; and the following preservative may be given them.

“ Take two handfuls of juniper-berries, bruise them, and let them infuse twenty-four hours in a quart of wine-vinegar; give half a pint of this liquor morning and evening. Repeat this remedy once or twice a week, even to the animals which appear perfectly sound. As to those in which the least sign of sickness appears, give them the following medicine :

“ Take Peruvian bark in powder, and filings of steel, of each two drams; one dram of sal-ammoniac; mix them in half a pint of wine, or in the same quantity of a strong decoction of juniper-berries in water, and give this with a horn every morning and evening for a week.

“ In the cure of the diseased, bleeding seems rather a thing to be avoided; for it inevitably increases the loss of strength, the infection of the solids, and thereby hastens the putrefaction of the fluids. As it is evident, by the opening of dead bodies, that the digestion is much vitiated, no solid food should be given to the sick animals: but dissolve rock-alum in bran and water, in such a quantity that the creature may take half an ounce of it in a day; and give, as soon as possible, the following medicine.

“ Take gum-ammoniac and assafœtida, of each half an ounce, rub them in a pint of vinegar till they are dissolved; strain the solution, if any dirt be mixed with the gums, and give it as warm as the creature can bear it for several days only once a day.

“ In case the symptoms are so urgent, that there is not time to make the foregoing solution, give half a table spoonful of volatile spirit of sal-ammoniac, in half a pint of wine, or of infusion of juniper-berries, and do this three times a day. If

a sweat breaks out, it should be kept up with an ounce of theriac or orvietan, dissolved in the same kind of vehicle. With this view the animal should be covered, and towards the end of the crisis strongly rubbed down.

“ The critical tumours require the utmost attention. As soon as there is the least appearance of them every means should be used to draw them outward. On those which are hard at the bottom, and show no disposition to suppurate, cataplasms the most capable of exciting the action of the solids, and of increasing the inflammation in the part, should be applied. Epispastic or blistering applications answer this purpose.

“ Take half an ounce of cantharides, two drams of euphorbium, both in powder, mix them with half a pound of leaven, and vinegar enough to make them of the consistence of a cataplasm or poultice, which keep twelve hours on the swelled part, and repeat it, if the tumour is not in a state to be opened.

“ As soon as the least fluctuation, or even a softness only, is felt, it should be opened, rather with the actual cautery than with a cutting instrument; and a knife made red-hot is better than a button-cautery. The tumour must be laid open from one end to the other, and as deep as the seat of the matter. The wound may be dressed with digestive and unguentum *Ægyptiacum*, equal parts of each; and at every dressing, that is, twice a day, the part must be washed with a mixture of one quart of common water, a pint of brandy, and two drams of sea-salt.

“ The rotten parts being cast off, and the suppuration become kindly, the wound may be dressed with the common digestive, made of turpentine, dissolved in the yolk of an egg, oil of St. John’s-wort, and brandy.

" And finally, the bad symptoms being all gone, and the wound being nearly healed, it will be necessary to give some purging medicine, which must be repeated *pro re nata*. This may be done with safety."

The Royal Society of Agriculture at Paris have likewise given an account of a Peripneumony, which constantly attacks the horned cattle every year, in the latter end of autumn, and the beginning of the spring, in several parts of France, and particularly in the Franche-Comte. It is known there by the name of *Murie*; and the following is the account given of its symptoms.

A dry cough, which at first comes but seldom, but is afterwards much more frequent; a sensible degree of fever; an oppression more or less troublesome, which increases when the animal has eaten, and which sometimes ceases, though this is very rare; a distaste to food, which increases with the disease: creatures which chew the cud, cease that chewing; but this sign is equivocal, because the same happens to them in all severe illnesses. A stinking breath; a dryness of the nose, mouth and tongue; and sometimes a discharge of matter by the nose, different in its degree of thickness: but the three last of these symptoms do not always happen.

Those which are observed in the dead bodies are, a lividness and stuffing of the lungs, an echimosis on their surface, suppurated pustules, gangrenous spots on the surface, as also gelatinous crusts of different colours, which adhere slightly to it; purulent abscesses, the matter of which insinuates itself into and wastes the lobes of the lungs, sometimes of one only, and at other times of both; an adhesion to the pleura, which is sometimes thick, inflamed, suppurated, or gangrened; a considerable quantity of reddish, purulent, putrid,

sometimes frothy sanguous water is found in the breast.

A sinking, a feebleness, a great difficulty of breathing, a continual cough, a redness of the eyes, a dryness of the tongue, a rattling in the throat, a sinking breath, are symptoms of an approaching death; as the being free from them affords hope of recovery.

The most common causes of this disorder are, the changes in the atmosphere from heat and drought to cold continued rains, to which the animals are exposed; or their being suddenly turned out from warm houses into wet cold air.

The cure must begin with bleeding in the jugular, taking a considerable quantity of blood, and repeating it on the same day, as also on the second and third, if the disease runs high. When the blood does not coagulate, but remains fluid and without cohesion, it indicates that the lungs are then so much stuffed and obstructed, that only the thinnest parts of it can pass to the heart, and that farther bleeding cannot be of service.

Emollient and refreshing glysters given and repeated two or three times a day for the first five or six days, have very good effects. No solid food should be given to the sick cattle, at least very little, or but just enough to support them. The best food that can be given them is wheaten flour, either mixed with warm water, or made into balls with honey, and given from time to time. Their drink should be bran and water, with honey dissolved in it; or an infusion may be made of the flowers of corn-poppies and violets, of each two handfuls, in boiling barley-water, to which may be added three ounces of honey: this mixture should be added to the former.

Rolls or pellets put into the creature's mouth two or three times a day will have very good ef-

fects. They may be made of six flat figs sliced and mashed, with five ounces of common honey and conserve of roses; or of four ounces of sirop of violets, the yolk of six eggs, five ounces of rose-water, and as much flour as to form pellets. Making the sick creature breathe from time to time the fumes of warm water in such manner that those fumes enter with the air into the lungs, is found to give great relief.

When the cough is very hard, frequent, and greatly fatigues the animal, the following bolus may be given, besides the addition made to the common drink. Take spermaceti and liquorice in powder of each two grains, *pillulæ de cynoglosso* one dram, and mix them up with conserve of althæa into a bolus.

If the fever and oppression abate, the following bolus may be given in the morning fasting. Take agarick in powder, flowers of sulphur, Florentine iris in powder, of each two drams, and make it into a bolus with honey.

If the sinking and putridity, the natural consequences of a great inflammation, still continue, give the following bolus, viz. flowers of sulphur six drams, spermaceti two drams, powder of wood-lice, gum ammoniac, of each a dram and an half, myrrh one dram, white honey as much as is necessary to render them of a proper consistence to be made into two boluses, to be given at two different times. The Peruvian bark, camphire and honey may be used to advantage. To this end, take of Peruvian bark three drams, of camphire one dram, and of simple oxymel as much as shall be sufficient to make them into a bolus, to be given in the morning fasting, and in two hours after, one or two hornfuls of a strong decoction of juniper-berries, or of elecampane. In case there be a desluxion from the nose, the following drink may be given,

viz. leaves of periwinkle, of lion's-foot, of fluellin, of ground-ivy, of each a handful, which boil in common water till one third is evaporated, and to the strained liquor add four ounces of honey, to be given at two different times: and now the first bolus with the flowers of sulphur need be given only in the evening. This last drink is peculiarly useful in that malignant peripneumony which frequently spreads among cattle. This distemper is, however, not contagious, as some have thought it, and is, so far as can be judged, that which affected the horses, poultry, and dogs, in 1764, and again the horses in particular in 1766.

The cure may be finished by one or two purging glysters, made as follows. Take leaves of senna three ounces, pour upon them two pounds and a half of a boiling emollient decoction, let them infuse for an hour, strain off the liquor, and dissolve in it three ounces of catholicon, for a glyster: but this should not be given till the dangerous symptoms have disappeared, and a chewing of the cud shows a return of the stomach's being able to do its office in animals which chew the cud.

As the influence of the air is greater in this disease than in almost any other, the sick creatures should not be exposed to cold or rain. The buildings in which they are kept should be neither too warm nor too cold, but had better, of these two, exceed in coolness. The air should be frequently renewed, and if the disorder is epizonic, the air should be fumigated by throwing from time to time a small quantity of vinegar upon live coals.

As to the means of preserving cattle from it, the sound should be separated from the sick, and sheltered as much as possible from the causes of the disorder; a small quantity of blood may be taken from them; they should be kept covered, their

common drink should be bran and water boiled, and emollient glysters may be given in case the least tendency to the disorder be perceived.

The Royal Society of Agriculture at Paris close their observations on particular diseases omitted by Dr. Barberet, author of the Memoir to which they adjudged their prize for the year 1765, and of which the greatest part of the foregoing is an abstract, with an account of the dysentery, a disease which frequently attacks only particular horses, and which sometimes becomes general and even contagious among them. In this last case, it is always malignant, is constantly attended with a fever, in the beginning light, but which afterwards becomes so high as frequently to be thought the principal disease. Its symptoms are, fainous, purulent, bloody stools; griping, tenesmus, an enormous heat of the entrails, a falling out of the fundament, &c. together with all those which indicate a fever attended with malignity. On opening the dead bodies, the intestines are generally found dry, or dilated with wind, containing a purulent matter, and always with signs of inflammation, ulcerated or gangrened: the spleen is inflamed and putrid, the rectum especially is in the worst state of any of the bowels, and clots sometimes of pure blood, sometimes mixed with fancies, are found in it.

If the sick horse is not too much sunk with the disorder, it is advisable to bleed him in the jugular. An ounce of oil of olives or of rape, mixed with half a glass of wine-vinegar and a glass of water, may be given morning and evening. The common drink should be bran-water, with one third of a decoction of burnt hartshorn: the food should be only barley, oats, or rye, boiled. An ounce of discordium mixed with bran-water acidulated with vinegar, may be given at times.

Glysters will be peculiarly beneficial. To this end, take of wheat-bran four handfuls, leaves and flowers of mullein of each one handful, seeds of fenugreek and of flax of each half an ounce. The bran, leaves, and seeds, should be boiled in five pounds of water to a diminution of one third. At the close of the boiling, the flowers should be added, and let stand to infuse. Two candles should be melted in the strained liquor for a glyster. In case the gripings are violent, a glyster may be made of the same decoction, with, instead of the candles, three ounces of sirop of diacodium, and half an ounce of ipecacuanha in powder. This glyster has surprisingly good effects. Towards the close of the disorder, the following deterfive glyster may be given. Take leaves of millepertius and of periwinkle, of each a handful; boil them in the same quantity of water as before directed, and to the same degree of diminution; and to the strained liquor add two ounces of Venice turpentine dissolved in the yolks of eggs, for a glyster.

Nitre and camphire are frequently given with good success. Take an ounce of nitre, dissolve it in two pounds of decoction of sorrel, and give it at twice with a horn: or, take nitre and camphire, of each two drams, and make them into a bolus with a sufficient quantity of honey.

The learned and judicious PETER LAYARD, of Huntingdon, M. D. and F. R. S. whose residence in the country, joined to his universal humanity, necessarily afforded him frequent opportunities to remark the beginning and progress of the contagious distemper which prevailed among the horned cattle in Great-Britain a few years ago, particularly from about the year 1765 to 1770; being then applied to by government for his advice, gave the following as the result of many carefully repeated observations he had made on that melancholy occasion.

SYMPTOMS.

“ THE first appearance of this infection is a decrease of appetite; a poking out of the neck, implying some difficulty of deglutition; a shaking of the head, as if the ears were tickled; a hanging down of the ears, and deafness; a dullness of the eyes; and a moving to and fro, in a constant uneasiness. All these signs except the last, increase till the fourth day: then ensue a stupidity and unwillingness to move, great debility, a total loss of appetite, a running at the eyes and nose, sometimes sickness and throwing up of bile, a husky cough, and shivering. The fever which was continual the three first days, now rises, and increases towards the evening: the pulse is all along quick, contracted, and uneven. A constant diarrhoea, or scouring of foetid green faeces, a stinking breath, a nauseous stream from the skin, infect the air in which the morbid creatures are placed. Their blood is very florid, hot, and frothy: their urine is high-coloured: the roof of the mouth and the barbs are ulcerated. Tumours, or boils, are to be felt under the fleshy membrane of the skin;

and eruptions appear all along their limbs, and about their bags. If a new milch-cow is thus ill, her milk dries up gradually, her purging is more violent, and on the fourth day she is commonly dry. There is such sharpness in the dung of the diseased, that a visible irritation is observed during some time in their fundament. They groan much, are worse in the evening, and mostly when they lie down. These symptoms continue increasing till the seventh day, on which, generally, though sometimes protracted till the ninth, the crisis, or turn, takes place.

“Bulls and oxen are not so violently attacked as cows and calves; and of these, cows with calf, and weakly cow-calves, are in the greatest danger.

“If a cow with calf, at the critical time of this disease, slips her calf, she then takes her fodder, and recovers. Some may only give signs of such abortion, and bear their calf several days, nay even weeks, before they slip it, and yet recover. Calves receive the infection from the cow, by sucking her milk; and may also, if first seized, infect the cow.

“This disease takes place at all times and seasons: but in summer and autumn it will rage most. The fate of the beast is generally determined on the seventh day from the invasion; though it has been sometimes delayed till the ninth.

“If eruptions appear all over the skin, or boils as big as pigeons’ eggs in different parts of the body, but especially from the head to the tail, along each side of the back-bone, and so ripe as to discharge putrid and stinking matter; if large abscesses are formed in the livers, or in any part of the body; if the dung is become more consistent and firm; if the urine is thick, and not quite so high coloured as before; if the beast has had a

shivering succeeded by a general glow of heat, upon which the fever has abated, and the pulse beats regularly; if the nose be sore or scabbed; if the eyes look bright and brisk, and if the beast pricks up its ears upon a person going into the hovel, and will eat a little hay or peas; these symptoms will determine that the creature is out of danger.

“ But if, on the seventh day, the eruptions, or boils, are decreased in bulk, or have totally disappeared without having broke or discharged outwardly; if the scouring continue almost constantly; if the breath be very hot, while the whole body, limbs, and horns are cold; if the groaning and difficulty of breathing are increased; if the running from the nose and eyes is lessened; if the eyes are dim, and sunk into the head, with a perfect stupidity; if the urine is dark coloured, the pulse intermitting, and a *cadaverous* smell is observed; we may assuredly pronounce the creature to be near its end.

“ *Ramazzini’s enphysema* was met with.

“ All the carcasses that were opened appeared extenuated by the scouring. Upon opening the skin much stinking air rushed out, and sometimes a purulent and *tanious* discharge. The vessels of the brain were turged, and filled with blood of a very red colour and loose texture; the ventricles filled with water. The membranes of the nose, the glands, the whole extent of the frontal sinus, and the pith of the horns, were highly inflamed, ulcerated, and full of small abscesses. There was the same appearance in the mouth and about the glands of the throat. The lungs were inflamed with livid sphacelated spots, here and there loaded with hydaticides; and the cellular texture was frequently distended with air. The heart was large, flabby, and dark coloured, containing in its ventricles clots of

black blood, of a very loose texture, without serum; the fat about it was of a bright yellow. The liver was large: its blood and biliary vessels were fully extended with dark fluid blood, and very deep coloured bile: the substance of the liver was so rotten, as to separate on the least touch. The gall-bladder was stretched to a great size, and full of greenish bile. The æsophagus was ulcerated in some. The paunch was distended with air, flabby, and contained a large substance like a dried turf, consisting of fodder hardened to that degree. There were several appearances of gangrene on all the stomachs. The honeycomb had no fluid in it, but some pappy fodder. The manyfold contained between its plaits, a great deal of dried fodder, which clung to their sides. The rennet-bag was empty, but highly inflamed, and gangrened in several places. All the intestines were empty, and were beset with red and black spots. The kidneys and bladder were large, without urine. The kidneys were of a loose texture, easily torn. The flesh in some was livid, in others of a lively red; but it soon turned green. The fat that remained was of a bright yellow. In such cows as were with calf, the uterus was gangrened in several places, and the water included in it stunk most intolerably. The virulence of the disease appeared to have sometimes fixed itself on the vital part, and sometimes on another, and frequently in more places than one.

To C U R E.

“ The beasts should be kept in well-aired houses and be plentifully bled from two quarts to one, according to their age and strength. They should be washed with warm water and vinegar, to clear the skin from filth, and be frequently rubbed,

which affords them much pleasure, as well as benefit. A rowel should be made as soon as possible in the dewlap, and it should be kept open for some time after the cure. If the dung be hard, a cooling purge should be given, and plenty of anti-septic drinks, such as bran-water, vinegar, bitters, salt; but no hay till they chew the cud. The mouth, barbs, and nostrils, should be washed carefully and frequently. If a purging comes on by the fourth day, it should be checked by warm medicines proper to throw the morbid matter off by the skin, such as snake-weed, and other warm plants, or Venice-treacle, with which Mr. Montgomery* cured six beasts out of seven. If the colour of the mouth becomes dark, the creature cold, the dung black and foetid, and the discharge from the mouth and nose fainous, an ounce of Jesuits'-bark, or oak-bark, with snake-root, or other warm ingredients, should be given every four hours, to prevent mortification. If matter is formed in the horns, or any other part of the body, an opening should be made there, as also in the emphysema, and digested by warm applications. If a purging does not come naturally after the crisis, the bowels should be emptied with a smart purge, after which a draught of warm ale may be given at night. On recovery, the beasts should be gradually exposed to cold air, and by degrees habituated to their usual food."

* One of the Doctor's neighbours in the country.

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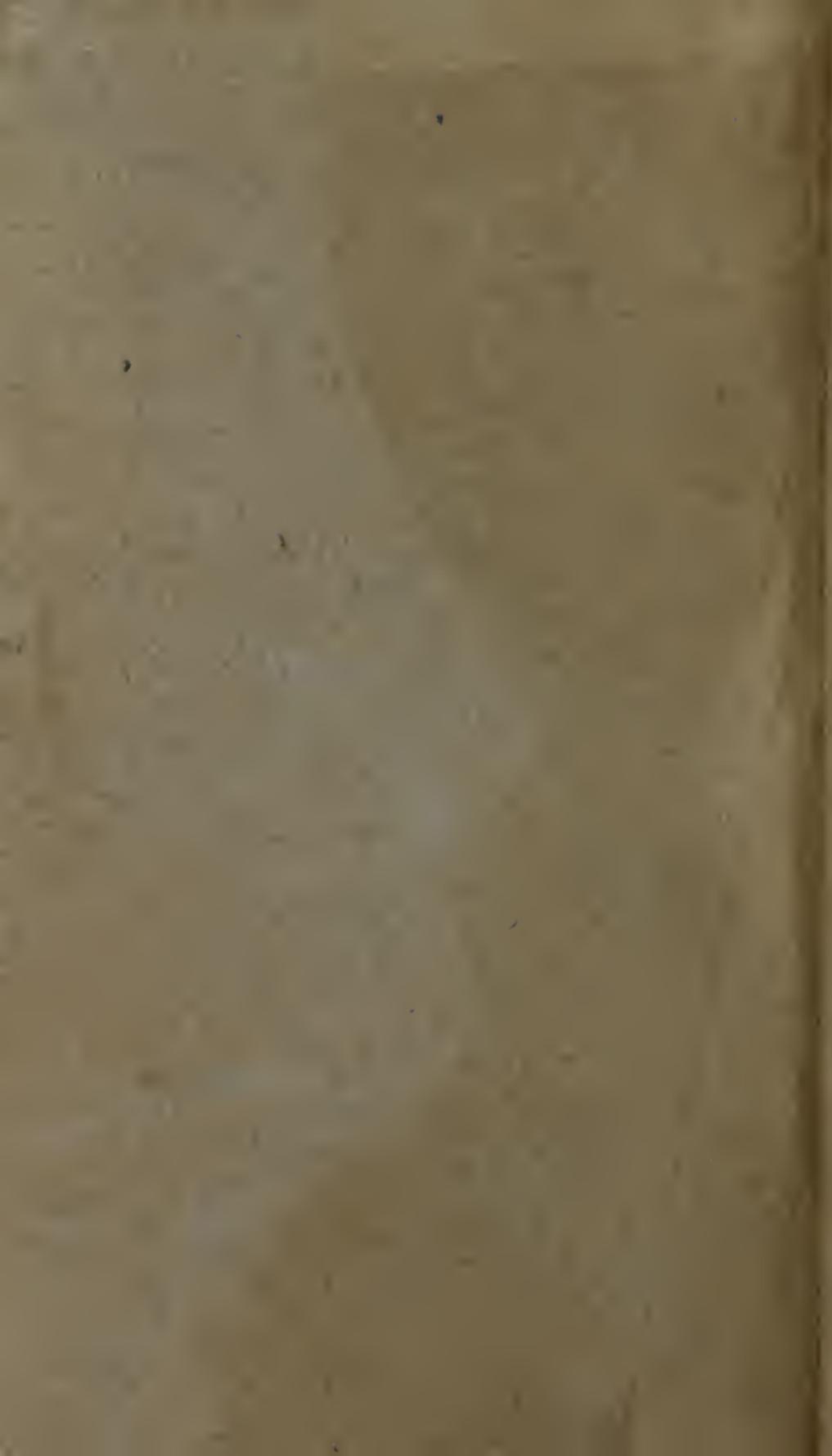
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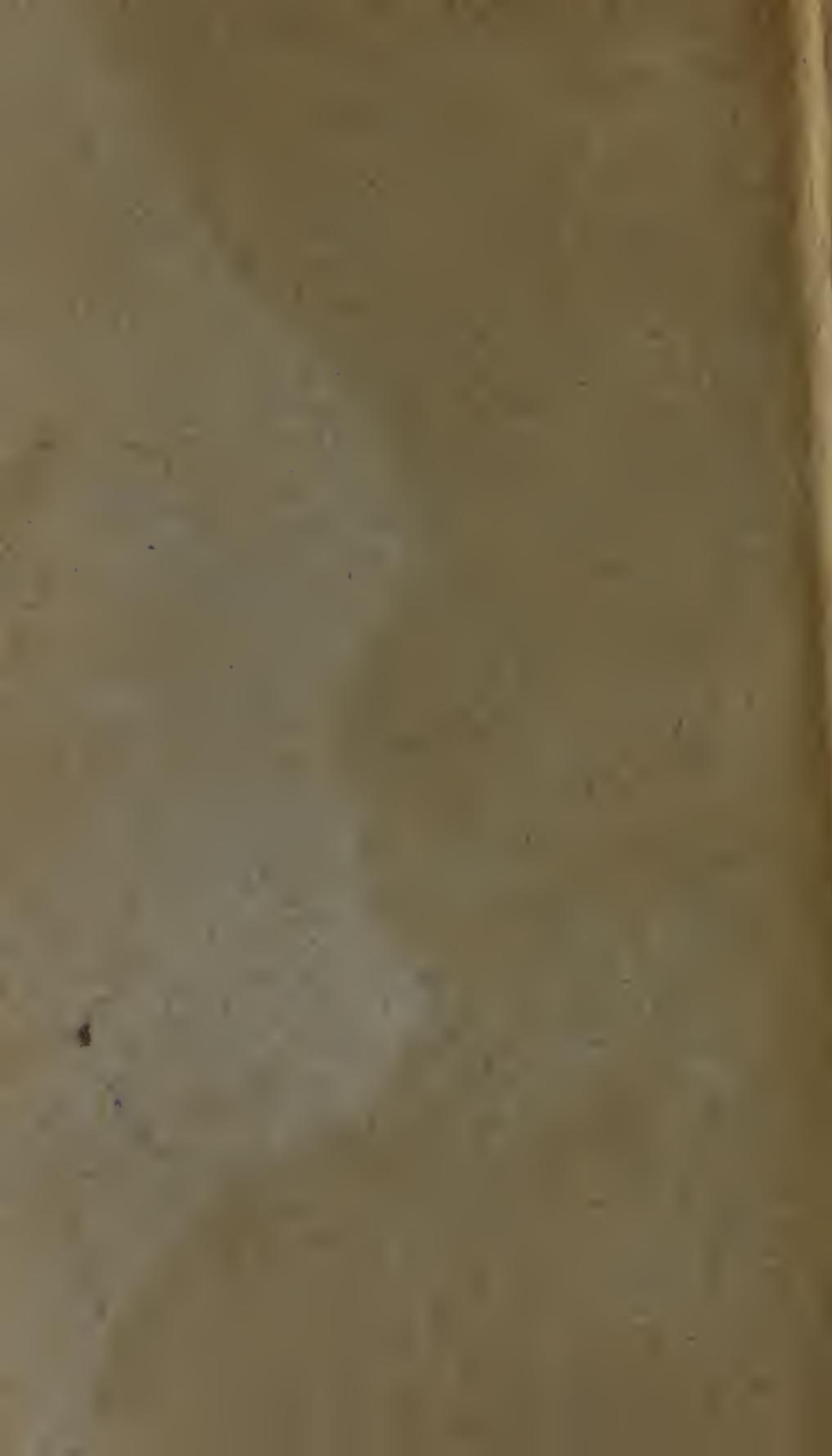
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